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PERSIAN GULF PILOT

COMPRISING
THE PERSIAN GULF AND ITS APPROACHES,
FROM RAS AL HADD, IN THE SOUTH-WEST,
TO CAPE MONZE, IN THE EAST

TENTH EDITION
1955

WALTER
STACKS

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Copies of these Notices can be obtained **gratis** *by Masters of ships from Mercantile Marine Offices in the United Kingdom. Copies may also be inspected at Dominion, Indian and Colonial Government Shipping Offices and at British Consulates.*

NOTATIONS OF SUPPLEMENTS AND ANNUAL SUMMARIES OF NOTICES TO MARINERS RELATING TO THIS BOOK.

To be filled in by Navigating Officer.

(In Chart Depôts the first two columns are alone to be filled up.)

Title.	Date of Publication and Number.	Date of insertions of Note in Margins of Book.

NOTICE.

This volume should not be used without reference to the latest Supplement and Annual Summary of Notices to Mariners affecting it which may have been published.

A Supplement to this volume will generally be published annually until the latter is again taken up for revision.

After the publication of Supplement No. 1, each succeeding supplement cancels the former.

Between the time of the volume being taken up for revision and the publication of the new edition no supplement will be issued, but early in each year a Summary of the Admiralty Notices to Mariners affecting the volume, which have been published during the preceding year, will be issued as a separate publication.

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PERSIAN GULF PILOT

COMPRISING

THE PERSIAN GULF AND ITS APPROACHES,
FROM RAS AL HADD, IN THE SOUTH-WEST,
TO CAPE MONZE, IN THE EAST

TENTH EDITION, 1955

Gt. Brit. Hydrographic Office

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LONDON
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To be obtained from
the Agents for the Sale of Admiralty Charts

1955

Seventeen Shillings and Sixpence Net

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CAUTION.

IN THIS WORK THE BEARINGS ARE REFERRED TO THE TRUE COMPASS, AND WHEN GIVEN IN DEGREES ARE RECKONED CLOCKWISE, FROM 000° (NORTH) TO 359°.

THE BEARINGS OF LIGHTS ARE GIVEN FROM SEAWARD.

THE LATITUDES AND LONGITUDES GIVEN IN THE TEXT ARE APPROXIMATE.

THE DISTANCES ARE EXPRESSED IN SEA-MILES OF 60 TO A DEGREE OF LATITUDE.

A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO THE TENTH PART OF A SEA-MILE. IT IS OFTEN ACCEPTED AS BEING ONE-TENTH OF A NAUTICAL MILE.

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FIGURES IN BRACKETS GIVEN AFTER THOSE DENOTING FEET, FATHOMS AND YARDS ARE THEIR EQUIVALENTS IN METRES.

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WHEN SHADING IS USED TO INDICATE COLOURS OF FLAGS, TIDAL LIGHT SIGNALS, OR BEACONS, IT IS AS FOLLOWS :

░	▥	▤	▧	■
Yellow.	Red.	Blue.	Green.	Black.

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ADVERTISEMENT TO THE TENTH EDITION

The Persian Gulf Pilot contains sailing directions for the Persian gulf and the approaches thereto, from Ras al Hadd, in the south-west to Cape Monze, in the east.

This, the tenth edition, has been compiled by Commander F. N. Shearme, R.N., and contains the latest information received in the Hydrographic Department.

The meteorological and ocean currents information has been revised by the Meteorological Office of the Air Ministry. Temperature is expressed in degrees Fahrenheit, rainfall in inches, and speed in knots and distance in sea miles unless expressly stated otherwise. Information received from meteorological services which do not use these units has been converted into the units mentioned above by the Meteorological Office.

Mariners and others are invited in the interests of navigation to forward to the Hydrographer of the Navy, Admiralty, Oxgate Lane, Cricklewood, London, N.W.2, any information that may come under their notice, which would be useful for the correction of the charts and other hydrographic publications issued by the British Admiralty; *early* advice as to newly-discovered dangers, the establishment of, or changes in, any aids to navigation, is specially requested.

Copies of a form (H. 102) on which to render information can be obtained gratis from the Hydrographer of the Navy, Creechbarrow House, Taunton, Somerset; or any of the agents in Great Britain and abroad, a list of whom is published, annually, in Admiralty Notice to Mariners No. 2.

By the publication of this volume, the ninth edition of the Persian Gulf Pilot, 1942, and its Supplement No. 7, 1954, are cancelled, and all information affecting that work contained in Notices to Mariners up to and including No. 512 of 1955 has been embodied in this volume; for Temporary and Preliminary Notices to Mariners affecting this edition, the list of Temporary and Preliminary Notices to Mariners in force, published monthly in the weekly edition of the Admiralty Notices to Mariners, should be consulted.

A. DAY,
Vice-Admiral,
Hydrographer of the Navy.

Hydrographic Department,
Admiralty, London,
26th February, 1955.

BIBLIOGRAPHY

The following publications, other than those of the British Government, have been used in the compilation of this edition:—

BRITISH.

The Statesman's Year Book, 1954
Shipping World Year Book, 1954
Whitaker's Almanack, 1954
P.C.G.N. List of Names in Persia, 1955

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ARABIC.

The definite article Al is only written with a capital at the beginning of a word. It assimilates before D, Dh, N, R, S, Sh, T, Th, and Z.

Arabic.	English.	Arabic.	English.
Abū or Abu	Father; possessor of.	Hasā	Pebbles.
		Heir	*See* Hair.
Abyadh	White.	Hīsar	Fort.
Ain or 'Ain	Eye; spring or well.	Hor or Haur	Shallow marsh (fresh or brackish).
Akdhar	Green.		
Al	The; the definite article.		
Alā	Height.		
A'lā	Higher, upper.	Ibn	Son, descendant.
'Amara or 'Imāra	Building; inhabited place.	Imām	Religious leader, holy man.
Ardh	Ground, earth, land.	Imara	Seat of a governor.
Azraq	Blue.		
		Jabal	Hill, mountain.
		Jazair	Plural of Jazīrat.
Bab	Gate; narrow strait.	Jazīrat or Jazīra	Island, Peninsula.
Bahr	Sea.		
Baīdha	White.	Kabīr	Large, great.
Band	Embankment, Dyke.	Kabr or Qabr	Tomb.
		Kad	Shoal.
Bu	Abbreviation of Abu.	Kasr or Qasr	Fort, castle.
		Kassar or Qāsar	Above-water dock, rocky islet.
Burt	Tower, fort.		
		Katah or Katat	Rock, patch of rocks.
Dōha or Dauha	Bay.	Khadrā	Green.
		Khaltj	Gulf, Bay, estuary, river, canal.
Fasht	Rocky reef.	Khān	Lord; inn.
		Khōr (*Properly Kaur*)	Arm of the sea, inlet; ravine; channel.
Ghar	Cave.		
Gharb	West.	Kubba	*See* Ghubba.
Gharbi	Western.	Kūt	Fort, town.
Ghubba	Deep-water bay or inlet.		
		Maghrib	West.
		Makallā	Anchorage.
Had or Hadd	Sandspit, low sandy point; frontier, boundary, edge.	Maraqqat	Soft shoal.
		Mashriq	East.
		Marsa or Mersa	Anchorage; fort.
		Minār or Manār	Tower, minaret; lighthouse.
Hail	Fence, barrier.		
Hair	Pearl bank.		
Hājj	One who has made the pilgrimage to Mecca.	Niwat	Steep-to shoal; pearl bank; coral reef.
Hajr	Hump-backed tract of sand.		
Hāla or Hālat	Dry or drying sandbank; sandy islet.	Qabr	Tomb.
Hamrā	Red.	Qal'a or Qal'at	Castle, fort.

Arabic.	English.	Arabic.	English.
Qasār	Above-water rock, rocky islet.	Sifa or Sīf	Coast, sandy beach.
		Sūq	Market place.
Qasr	Fort, castle.	Sūr	Wall, rampart.
		Surkh or Sorkh	Red.
Raq'at	Hard shoal.		
Ras (*Properly* ***Rā's***)	Head; cape, point; peak.	Tall	Hillock.
Rig	Reef, shoal, sandbank.	Turba or Turbat	Tomb.
Ruūs	Plural of Ras.		
		Umm	Mother of; the "u" is often dropped and "m" prefixed to the place-name, e.g. "Magheir" from "Umm Gheir."
Sadd	Obstruction, barrier, dam.		
Saiyid	Descendant of the prophet; lord, chief.		
Seghir or Saghīr	Small.		
Shaikh	Chief of a tribe; elder; religious leader.	Wadi or Wādi	Watercourse, riverbed, valley.
Sharq	East.	Wālī	Local governor.
Shatt	Large freshwater river.		
Sheb or Shi'b	Rocky shoal, inshore reef.	Zarqā	Blue.
		Zaur or Zor	Bond, twist, turn.

PERSIAN.

Persian.	English.	Persian.	English.
Āb	Water, river.	Deh	Village.
Āb-rāh	Water-course; aqueduct.	Dehān	Mouth, opening, river mouth.
-Abād	Inhabited place.	Dīz, dez or Dezh	Fort.
Abū or Abu	Father, possessor of.		
'Alā	Height.	Fānūs	Lighthouse.
A'lā	Upper, higher.	Forūd-gāh	Halting-place; airfield.
Bād-gīr	Wind-tower.		
Bahr	Sea.	Gharb	West.
Band	Barrier, dyke, embankment.	Gharbi	Western.
		Gil	Mud, clay.
Bandar	Harbour sheltered anchorage landing place.	Had or Hadd	Sandspit, low sandy point, frontier, boundary, edge.
Bīsīm	Radio.		
Bu	Abbreviation of Abū	Hājī	One who has made the pilgrimage to Mecca.
Burj	Tower, fort.		
Chigā	Hill.		
Dar	Door; passage, channel.	Imām or Emām	Religious leader, holy man.
Daryā	Sea; river.	-Istan or -estān	Place of, inhabited by.

Persian.	English.
Jabal	Hill, mountain.
Jazīreh	Island, peninsula.
Janūbī or Jinubi	Southern.
Kalāt	Castle on a mountain.
Kalleh	Summit.
Khāk	Dust, earth.
Khalīj	Gulf, bay, estuary, river, canal.
Khān	Lord, inn.
Khāneh	House.
Khōr (*Properly Khūr*)	Arm of the sea, inlet; ravine; channel.
Kūh	Hill, mountain.
Kūt	Fort, town.
Maidān-e-Taiyārāt	Airfield.
Minār or Manār	Tower, minaret; Lighthouse.
Pul	Bridge, viaduct.
Qabr	Tomb.
Qal'eh	Castle, fort.
Qariyeh	Village.
Quileh	Summit, hill-top.
Ras (*Properly Rā's*)	Head; cape; point; peak.
Rīg	Sand, gravel.
Rūd	River.
Rūstā	Village.
Sabz	Green.
Saiyed	Descendant of the Prophet; lord, chief.
Sar	Peak, summit; beginning.
-Sār	(Place) abounding in
Shāh	King.
Shahr	City, town.
Shaikh	Chief of a tribe; elder, religious leader.
Shamāl	Northern.
Sharq	East.
Shatt	Large freshwater river.
Shīb	Descent, slope.
Shur	Clay hills.
Sīah	Black.
Sitūn	Pillar, column.
-Stān	Place of, inhabited by.
Sūr	Wall, rampart.
Surkh or Sorkh	Red.
Tangeh	Strait; isthmus; defile.
Turba or Turbat	Tomb.
Zāhir	Apparent, conspicuous.
-Zār	(Place) abounding in.
Zīr	Under, below.

SYSTEM OF ORTHOGRAPHY

The following rules for the spelling of geographical names (termed P.C.G.N. Principles) have been adopted for British official use, and the names in Admiralty Hydrographic publications will be rendered in accordance with these rules as opportunity occurs.

In new editions of the various volumes of sailing directions names are, generally speaking, given in accordance with these rules, but where the name on the chart shows an older rendering of a name, such chart name is given in brackets after the new rendering and will also be given in the Index.

The rules for spelling in the P.C.G.N. Principles are as follows :—

(1) The spelling of the names of (*a*) regions and geographical features of continental or inter-national extension, (*b*) water-areas extending beyond the territorial limits of recognized government, and (*c*) countries, shall be in accordance with English conventional usage ; *e.g.*, (*a*) Sahara, Alps, Danube, (*b*) Bay of Biscay, (*c*) Italy.

(2) In the case of oceanographical features lying outside territorial waters, the descriptive terms entering into their names shall be in English ; *e.g.*, Challenger Bank, Dogger Bank, Walfisch Ridge (*not* Walfisch Rücken).

(3) The approved name of any administrative division of a state,* or federation of states, or of any natural or artificial geographical feature or of any place lying wholly within one state, or federation of states, shall be that adopted by the supreme administering authority concerned with that state or federation of states ; *e.g.*, Uttar Pradesh (*not* United Provinces), Kaliningrad (*not* Königsberg) :

but, should a different name be current in English conventional usage, the latter may be given subordinate recognition ; *e.g.*, Cabo de Hornos (Cape Horn), Dhiórix Korínthou (Corinth Canal), Moskva (Moscow).

(4) Where any name of the kinds referred to in Section (3) above contains a descriptive term in a foreign language that term shall not be translated into English ; *e.g.*, Cabo de Hornos (*not* Cape de Hornos), Schloss Bellinghoven (*not* Bellinghoven Castle), Isola d'Ischia (*not* Island of Ischia) :

but, where a geographical term on a foreign map or chart stands in isolation and is neither a geographical proper name nor is attached to such a name, it may be translated ; *e.g.*, " bridge " (*not* German " Brücke "), " ford " (*not* Russian " brod ").

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* For the purpose of applying these Principles, the term "state" shall be taken to include an independent country, or colonial territory, or protectorate, protected state, or trust territory.

(5) The names of places and of geographical features in countries which officially use varieties of the Roman alphabet shall be accepted in their official spelling, including the accents and diacritical marks used in the respective alphabets.

(6) The non-Roman letters in the official names of places and geographical features in countries which use partly-Roman alphabets may be transliterated into Roman letters in accordance with the conventions of the respective partly-Roman alphabets.

(7) In countries where the official alphabet of the administering authority is not Roman :

(*a*) where an official Romanization acceptable to the Committee is in current use the spelling of names shall be in accordance with it.

(*b*) where no official national Romanization exists but a system of Roman transliteration has been accepted by the Committee for the country under consideration, the official forms of names shall be transliterated in accordance with it.

(*c*) where there is no system of Romanization, or none acceptable to the Committee, the official forms of names shall be transliterated into the conventional alphabet given below.

(8) In countries where the official script is not alphabetical the official forms of names shall be rendered in Roman letters in accordance with systems of transcription approved by the Committee, *e.g.*,
China : the Wade-Giles system as modified in 1942
Japan : the Hepburn system as recommended in 1942
Korea : the McCune-Reischauer system.

(9) In those territories where the foregoing Principles may prove to be inapplicable, geographical names should, whenever possible, be recorded in the alphabets officially used for the languages concerned, or be collected in the field by the scientific methods employed for the phonetic recording of speech. Only when these means fail should they be recorded in the conventional alphabet given below.

This system aims at giving a close approximation to the *local* pronunciation ; but it is recognised that in some languages, notably Russian, Greek, and Arabic, the necessity for letter-for-letter transliteration often renders this impossible.

CONVENTIONAL ALPHABET

Vowels

Symbol	Range of sound represented
a	*a* in *father* ; all the sounds represented by *a* in the French words *patte, pas, page, pâle* ; *o* in English *son* or *u* in *cut* ; also a shade of the unstressed neutral vowel (see under *ŏ* below).
e	the first part of the diphthong in *day*, *e* in French *thé* ; *ai* in *fair*, *è* in French *père* ; *e* in *bet* ; a shade of the unstressed neutral vowel (see under *ŏ* below).
i	*ee* in *fee*, *i* in French *si* ; *i* in Italian *via* ; *i* in *sit*.
o	*ou* in *bought*, *aw* in *law*, *o* in *not* ; *eau* in French *beau*, *o* in *rotund*.
ŏ	*ŏ* in German *schŏn*, *eu* in French *peu* ; *eu* in French *peur*, *œ* in French *œuf* ; *ea* in *earth* (the last is the stressed neutral vowel in English).
	The unstressed neutral vowel (the sound of *a* in *marine*, *e* in *often*, *u* in *difficult*) is better represented, according to its nearest approximation, by *a* or *e*.
u	*oo* in *boot* ; *oo* in *foot* or *u* in *put* (but not in *but*).
ü	*ü* in German *über*, *u* in French *lune*.
y	the cavernous vowel, unknown in standard English, represented by *ы* in Russian and by *ı* in Turkish. Note that *y* is also used for a consonant-symbol (see below).

Diphthongs

Diphthongs may be represented by combinations of the vowel-symbols given above.

Consonants

Symbol	Range of sound represented
b	English *b*, any other sound recognized as a kind of *b* by English ears, as *b* in Spanish *saber*.
ch *or* **c*** (= tsh)	*ch* in *church*. *c* is established with this value in parts of Africa. * *See* Instruction 6, below.
d	any sound recognized as a kind of *d*.
dh	the soft sound of English *th* in *this, they*, etc.
f	any kind of *f*.
g	*g* in *got* or *gift*.
gh	the soft guttural sound represented by غ (*ghain*) in Arabic, which resembles that of Parisian *r*.
h	(i) the aspiration of vowels (the sounds preceding the vowels in *her hat*). (ii) the aspiration of consonants (emphatic *k*, *t* and *p* are aspirated in English ; *b* is often aspirated in Irish English). In a conventional alphabet it is possible to distinguish between the digraphs (pairs of letters standing for single sounds) *dh, gh, kh, sh, th* and *zh*, and aspirated *d, g, k, s, t* and *z*, respectively, only by means of elaborate devices.
j (= dzh)	in *jib* or *g* in *gem*.
k	any kind of *k*-sound, as *c* in *cat*.
kh	*ch* in Scottish *loch* or German *ach*.
l	*l* in *leave* ; *ll* in *wall* ; *ll* in Welsh *llan*.
m	English *m*.
n	English *n*.
ñ *or* **ny**	as in Spanish *cañón*. Established in many parts of Africa.
ng	*ng* in *singer* ; *ng* in *finger*.
p	any kind of *p*.
q	the guttural sound represented by ق (*qaf*) in Arabic.
r	*r* as sounded in Scotland ; any other clearly rolled or trilled *r*-sound, like *r* in Spanish *pero*.

Symbol	Rauge of sound represented
	Consonants
s	*ss* in *hiss* (but not *s* in *his*).
sh *or* **s***	*sh* in *fish*.
	* *See* Instruction 6, below.
t	any kind of *t*.
th	hard English *th* as in *thistle*.
v	English *v*.
w	English *w*.
x (= ks)	*x* in *extra* (not *x* in *exact*).
y	*y* in *yet*. Note that *y* is also used as a vowel-symbol (see above).
z	English *z* or the *s* in *was*.
zh (*or* **ž**)*	*j* in French *je* ; *s* in *measure*.
(‘)	(inverted comma) The Semetic sound represented by ع (*‘ain*) in Arabic ; the glottal stop. (In practice the two will not conflict.)
	* *See* Instruction 6, below.

Instructions for spelling in the conventional alphabet

1. Standard native pronunciation is to be taken as the basis for spelling.

2. Each sound is to be represented by its closest corresponding symbol, and a symbol may be doubled only to indicate a clear repetition of the same sound.

3. If their representation be indispensable, a vowel-symbol may be marked with :
   (*a*) an acute accent (′) for *stress* (*Kórinthos*—Greece)
   (*b*) a macron (¯) for *length* (*Tōkyō*—Japan)
   (*c*) a tilde (˜) for *nasalization* (*Eggã*—Nigeria, *unofficial*).

4. Retroflex, emphatic, implosive or ejective consonants may be indicated by dots beneath the symbols representing them.

5. Palatalization of consonants as in Russian may be indicated by an apostrophe (’) after the symbol affected.

6. If it be imperative to distinguish between *sh* and *zh* (the symbols given above) and aspirated *s* and *z* respectively, the alternative symbols *š* and *ž* may be used for the former pair. Similarly, *c* and *ch* could stand for the unaspirated and aspirated “ ch ” sounds respectively.

7. In the narrow rendering of names in, and their close transliteration into, the conventional alphabet, recommended for textual documents and particularly for gazetteers, the diacritical marks listed in 3, 4, 5 and 6 above, should be used. From the broad rendering in, and broad transliteration into the conventional alphabet, appropriate to maps and charts, these marks may be omitted. (This instruction applies only to the conventional alphabet and has no bearing whatever on No. 5 of the Principles of Nomenclature.)

Alphabetical order

The full conventional alphabet consists of the following thirty-seven symbols :

a, b, ch *or* **c, d, dh, e, f, g, gh, h, i, j, k, kh, l, m, n, ñ** *or* **ny, ng, o, ŏ, p, q, r, s, sh** *or* **š, t, th, u, ü, v, w, x, y, z, zh** *or* **ž,** (‘)

but names written in it should be filed or arranged in common English alphabetical order disregarding (‘).

LAWS AND REGULATIONS APPERTAINING TO NAVIGATION.

While, in the interests of the safety of shipping, the Admiralty make every endeavour to include in their hydrographic publications details of the laws and regulations of all countries appertaining to navigation, it must be clearly understood:—

(*a*) *that no liability whatever can be accepted for failure to publish details of any particular law or regulation, and*

(*b*) *that publication of the details of a law or regulation is solely for the safety and convenience of shipping and implies no recognition of the international validity of the law or regulation.*

INFORMATION RELATING TO ADMIRALTY CHARTS AND PUBLICATIONS, GENERAL NAVIGATION, AND GENERAL METEOROLOGY.

ON THE CORRECTION OF ADMIRALTY CHARTS.

Guides to Navigation.—In addition to the charts, the navigational publications which are primarily affected by the continual changes and alterations that take place are the Admiralty Sailing Directions, the Admiralty List of Lights, Fog Signals and Visual Time Signals, and the Admiralty List of Radio Signals. The Admiralty Notices to Mariners contain information mainly for the correction of the charts and navigational publications.

CHARTS.

1. **Degree of Reliance.**—It should be clearly understood that the value of a chart depends on the character of the original survey and on the completeness of the reports of subsequent changes. The remarks on "The Use of Charts as Navigational Aids, &c." which are subjoined should be carefully studied in this connection.

2. **System of Dating and Issue of Corrected Copies.**—Admiralty charts after first publication are kept corrected by means of new editions, large corrections, and small corrections. Copies of charts issued by the Hydrographic Supplies Establishment, Admiralty Chart Agents or Admiralty Chart Depots are corrected, except from temporary and preliminary Notices to Mariners, for all navigational information to the date of issue.

New Charts.—The date of publication of a chart is shown outside the bottom margin, in the middle, e.g.:—

Published at the Admiralty 30th May, 1947.

New Editions.—When a chart is revised throughout and modernised in style a new edition is published, the date being shown outside the bottom margin and to the right of the date of publication, e.g.:—

New Edition 2nd Jany., 1947.

All large and small corrections notations are at the same time erased, and all old copies of the charts are cancelled.

Large Corrections.—When a chart is corrected from important information which is too comprehensive to promulgate by Admiralty Notice to Mariners or to insert conveniently by hand on existing copies, but when the chart is not revised throughout, the date on which these corrections are made is shown on the chart outside the bottom margin and to the right of the date of publication, and in the case of a chart already marked with a new edition date, below such date, e.g.:—

Large corrections 10th Feb., 1947.

All small corrections notations are at the same time erased, and all copies of the chart are cancelled.

Small corrections.—

(*i*) When a chart is corrected from the information promulgated in an Admiralty Notice to Mariners (except temporary and preliminary Notices), the year, if not already shown, and number of the notice are entered in the bottom left-hand corner of the chart, e.g.:—

Small corrections 1947-*903.*

Copies of the chart stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents and the Admiralty Chart Depots are corrected by hand from such information.

(*ii*) Prior to 1954, when a chart was corrected from information which was considered of no importance from the standpoint of safe navigation, and which was, therefore, not promulgated in an Admiralty Notice to Mariners, the year, if not already shown, and date of the correction were entered on the chart, in one of two ways, in the bottom left-hand corner below the margin and in sequence, with the notations referred to in the preceding paragraph, e.g.:—

Small corrections, 1947—$\boxed{5.20}$—

or Small corrections 1947—(VI.*25*)

These indicated that the chart plate received minor corrections on the 20th May or 25th June, respectively, which would appear on later printings.

In such cases copies of the chart held by ships and establishments were not usually replaced by new copies, but in exceptional cases, e.g., when new compasses were inserted, new copies of the charts might be supplied. It should, however, be particularly noted that the absence of corrections represented by square or bracket dates from a chart did not invalidate it for navigation.

(*iii*) Since 1954, in order that more attention may be given to New Editions, Large Corrections and corrections by Notices to Mariners, and for other reasons, the making of minor corrections to Chart plates as in (*ii*) has been discontinued. Information of no importance to safe and convenient navigation is instead recorded for inclusion in the next New Edition or Large Correction; or, for promulgation, in a later Notice to Mariners should a change of circumstance alter the importance of the information.

In consequence, the small correction date enclosed in a rectangle does not appear later than 1953 on navigational charts. The date within brackets may still appear and is then an indication that magnetic compasses have been corrected for a change in variation.

3. Correction of Charts in Ships.—All small but important corrections affecting navigation that can be made to the charts by hand are promulgated in Admiralty Notices to Mariners and, with the exception of corrections from temporary or preliminary Notices, should at once be neatly made in waterproof violet ink on the charts affected, the year (if not already shown) and numbers of the notices being inserted, also in waterproof violet ink, in the bottom left-hand corner of the chart. The recognised abbreviations shown on Admiralty chart No. 5011 (" Signs and abbreviations used on Admiralty Charts ") should be used.

Generally speaking, the amount of information which should be inserted on a chart should be in accordance with that already shown.

On large scale charts, the abridged descriptions, as shown on chart No. 5011, of all details of all lights, light-buoys and fog signals, and the year dates of obstructions, reported shoals, dredged channels, depth on bars or in shifting channels, and irregularities of lights, should be inserted.

On coastal charts, the abridged descriptions of only the principal lights and fog-signals, i.e., those to assist in approaching or making the land, should be inserted.

Particulars of such lights should be omitted, in the following order, as the scale of the chart decreases, viz.:—

(i) Elevation, (ii) Period, (iii) Number in Group, and (iv) Visibility.

Particulars of fog signals should be inserted in their appropriate positions if space permits, but should otherwise be entered in a tabulated list under the title or some other convenient place on the chart.

Inner harbour light-buoys and beacons should not be inserted on coastal charts, and against other light-buoys only the character of the light should be inserted.

On ocean charts, lights which are visible 15 miles or over should alone be inserted and then only their character and colour.

On all charts, writing should be inserted as much as possible clear of the water, unless the relative objects are on the water, and care should be taken not to obliterate any information already on the chart. When cautionary or tidal notes, &c., are inserted, they should be written in a convenient but *conspicuous* place, preferably near the title, where they will not interfere with other details.

Erasures should never be made but the details should, when necessary, be crossed through in waterproof violet ink.

Admiralty Notices to Mariners are occasionally accompanied by reproductions of portions of charts (known as " blocks "), and when correcting charts from such blocks the following points should be borne in mind:—

(i) A block may not only indicate the insertion of new information, *but also the omission of matter previously shown.* The latter would, however, invariably be mentioned in the text of the Notice, and the fact that a block accompanies a Notice should not cause the text of the Notice to be disregarded.

(ii) The limiting lines of a block are determined for convenience of reproduction and need not be adhered to when cutting out for pasting on the chart, provided that the point mentioned in the preceding paragraph is taken into consideration.

(iii) The new information shown on a block can sometimes be inserted on the chart by hand, the reason for issuing a block in such a case being to avoid a long description of the new information in the text of the Notice.

(iv) Owing to distortion the blocks do not always fit the charts exactly, care should therefore be taken when pasting a block on to a chart that the more important navigational corrections fit as closely as possible. This can best be assured by fitting the block while it is dry and making two or three pencil ticks round the edges for use as fitting marks after the paste is applied.

Corrections from Temporary or Preliminary Notices to Mariners should be inserted on the charts *in pencil* and the year and number of the notice should be shown against them, e.g.:—N.M. 625/1947 temp., and also in the bottom left-hand corner of the chart, in pencil, *below* the small corrections notations (*see* above). Temporary corrections should be rubbed out when the notice is received cancelling them, but preliminary corrections should be inked in when the notice is received reporting that the changes have been made.

Charts stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents and the Admiralty Chart Depots are *not* corrected from Temporary or Preliminary Notices to Mariners, and when charts are received from one of these sources they should be corrected in pencil as necessary from the copies of such Notices already held, or from those supplied with the charts.

Corrections from Radio Navigational Warnings concerning derelicts and drifting obstructions, the temporary extinction of lights, displacement of important aids to navigation, ice reports, &c., should also be noted *in pencil*, as received, on the charts affected. Radio Navigational Warnings of a permanent nature and those relating to derelicts and drifting obstructions dangerous to navigation are re-issued in the form of Admiralty Notices to Mariners, but other warnings are not re-issued in this way, except in special circumstances.

Corrections from information received from authorities other than the Admiralty should be noted, *in pencil*, on the charts affected, but no charted danger is to be expunged without the authority of the Hydrographer of the Navy.

NAVIGATIONAL PUBLICATIONS

1. Admiralty Sailing Directions, Supplements, &c.—The Admiralty Sailing Directions, consisting of about 73 volumes for the whole world, contain general information useful to the navigator.

An index chart bound near the beginning of each volume shows the area dealt with and the serial numbers and limits of all Admiralty charts for the area which were published *when the volume was printed.*

Each volume is periodically revised throughout, and, in the intervals between the publication of new editions, Admiralty Notices to Mariners and Supplements are published to enable the volume to be corrected. It should, however be clearly understood that Sailing Directions cannot be correct in all minor details after the date of the latest Supplement.

The above-mentioned corrections are not made in the Sailing Directions stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depots.

A new edition of each volume of Sailing Directions is published at intervals of approximately from ten to twelve years. The number of the latest Admiralty Notice to Mariners used in its compilation is given in the "Advertisement" on page iii of each volume, and the numbers of the Notices affecting it between the dates of going to press and issue to ships and establishments are given in the Notice announcing its publication, to enable the new edition to be corrected before being brought into use.

A Supplement to each volume is generally published annually, each succeeding Supplement cancelling the former. When a volume is taken up for revision, however, no further Supplement to that edition is issued, but subsequent Notices to Mariners affecting it are summarised each year and issued as a separate publication, until the new edition of the volume is published.

A tabular form for notation of the existence of Supplements and Summaries of Notices is printed on the front fly-leaf of all Sailing Directions, and these notations are made as necessary in all copies issued by the Hydrographic Supplies Establishment and the Admiralty Chart Depots.

Supplements and Summaries of Admiralty Notices to Mariners should be retained intact. *Whenever reference is made to the Sailing Directions, the Supplement, and where applicable the Summary, must be consulted.* The existence of a Supplement or Summary of Admiralty Notices to Mariners is to be entered in the tabular form inside the cover of the Sailing Directions. New and amended information appearing in the Supplements for the first time is indicated by square brackets, and deletions from the previous Supplement are indicated by horizontal lines.

Admiralty Notices to Mariners affecting Sailing Directions *are not* to be cut up and pasted in, but the book is to be annotated in the margin, or corrected in manuscript, as convenient.

2. The Admiralty List of Lights, Fog Signals and Visual Time Signals.—The Admiralty List of Lights, Fog Signals and Visual Time Signals for the world is issued in twelve volumes divided geographically as shown on the index chart at the beginning of each volume.

Light-buoys are *not* included in the list.

The volumes are published annually at the rate of one volume per month; however, if there are insufficient corrections to justify the publication of a new edition of any volume, this will be notified by Notice to Mariners.

Each volume will be issued with an inscription on its cover and title page stating the date to which the volume has been corrected, which will be approximately eight weeks prior to the date of its issue. Corrections or additions to each volume, which may occur between the date of correction and date of issue, will be promulgated by Section III of the Weekly Edition of Admiralty Notices to Mariners announcing the Publication of the new volume.

Amendments.—Important amendments are promulgated in Admiralty Notices to Mariners. In Section III of each Weekly Complete Edition of these Notices will be found additions and alterations made to Lights, Fog Signals and Visual Time Signals by the Notices issued during the week affected; this section also includes other amendments, particularly amendments of a Temporary nature, which have not yet or will not necessitate the issue of a Notice to Mariners.

Corrections to the Light Lists may be extracted from Section III and pasted in the appropriate volume.

Note.—Corrections are not made in copies of the Lists of Lights, &c.,

stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depots, and copies received from these sources should accordingly be corrected from the weekly editions of the Notices to Mariners before being brought into use.

3. **The Admiralty List of Radio Signals.**—The Admiralty List of Radio Signals is issued as follows:—

Volume I.—Communications—Comprises particulars of radio-telegraph coast stations, together with general regulations; it also includes such subsidiary services as medical advice supplied by radio.

Volume II.—Navigational Aids—Comprises particulars of services from direction-finding stations and radiobeacons including air radiobeacons useful to ships; also stations giving QTG service and calibration stations; all relevant codes and regulations will be found in this volume.

Volume III.—Meteorological Services—Comprises particulars of weather services provided for the use of shipping, together with relevant codes.

Volume IV.—Meteorological Observation Stations.

Volume V.—Comprises particulars of Radio time signals, Uniform time system, navigational warnings and Position fixing systems (Decca, Loran Consul, etc.).

New editions of each volume will normally be published annually.

All corrections subsequent to the date of publication are promulgated in Section VI of the complete weekly edition of Admiralty Notices to Mariners.

Copies of the List stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depots are not kept corrected, and Lists received from these sources should accordingly be corrected from the weekly editions of the Admiralty Notices to Mariners before being brought into use.

4. **The Admiralty Tide Tables.**—The Admiralty Tide Tables are published in three sections as follows:—

For " EUROPEAN WATERS" (including Mediterranean Sea)."
For " ATLANTIC AND INDIAN OCEANS."
For " PACIFIC OCEAN AND ADJACENT SEAS.

Each section contains two parts, Part I giving tidal predictions for Standard Ports and tidal stream predictions for certain straits and channels. Part II giving data for predicting tides at places which are not Standard Ports.

Admiralty Tide Tables, Part III, contains instructions for predicting tides and tidal streams, and for analysing observations of tides and tidal streams, with tables to assist prediction and analysis.

THE USE OF CHARTS AS NAVIGATIONAL AIDS AND GENERAL REMARKS RELATING TO PRACTICAL NAVIGATION.

(1) **Reliance on a chart.**—The value of a chart must manifestly depend upon the accuracy of the survey on which it is based, and this becomes more important the larger the scale of the chart.

To estimate this the date of the survey, which is always given in the title, is a good guide. Besides the changes that, in waters where sand or mud prevails, may have taken place since the date of the survey, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail, and, until a plan founded on such a survey is tested, it should be regarded with caution. It may, indeed, be said that, except in well-frequented harbours and their approaches, no surveys yet made have been so minute in their examination of the bottom as to make it certain that all dangers have been found. The fullness or scantiness of the soundings is another method of estimating the completeness of a chart. When the soundings are sparse or unevenly distributed, it may be taken for granted that the survey was not in great detail.

It appears to be insufficiently realised that the degree of reliance which may reasonably be placed upon an Admiralty chart, even in surveys of modern date, is mainly dependent on the scale on which the survey was made. The scale for publication is now generally that of the original survey, except in the case of coast sheets which are sometimes reduced. It should not, therefore, be assumed that the original survey was made on a larger scale than that published.

It must be borne in mind that the principal method of ascertaining the inequality of the bottom of the sea is by the laborious process of sounding, and that in sounding over any area, the boat or vessel obtaining the soundings is kept on given lines; that each time the lead descends, or a sonic sounding is taken, the depth over only a small area is obtained, the case of the lead, it has a diameter of only a few inches, and that consequently each line of soundings, though miles in length, is only to be considered as representing a narrow width.

Surveys are not made on uniform scales, but each survey is made on a scale commensurate with its apparent importance. For instance, a general survey of a coast which vessels only pass in proceeding from one place to another is not usually made on a scale larger than one inch to the nautical mile, while surveys of areas where vessels are likely to anchor are made on a scale of three inches to the mile, and surveys of frequented ports or harbours likely to be used by fleets, on a scale of from six inches to ten inches to the nautical mile.

Close examination by sounding is the only method by which surveys on a large scale can be made, and in view of the vast mileage of surveys yet requiring completion in the interests of navigation, it would be a waste of time to undertake large scale coast surveys.

The scale on which a survey is to be conducted having been settled, it is manifestly superfluous to obtain more lines of soundings than can be represented on the paper. 100 soundings, which is the maximum number that can be placed with clearness on every square inch of paper, means that on a scale of one inch to the mile each sounding on the chart occupies an area representing eight acres of actual ground, whilst on a scale of six inches to the mile each sounding represents an area of a little less than a quarter of an acre, i.e., of 100 feet square.

The following diagram represents as many soundings as can be placed legibly on a square inch of paper:—

16	15	15	13	13	14	12	11	10	9
14	15	14	14	13	13	12	11	9	8
15	15	14	17	16	14	13	10	10	9
16	16	17	18	16	12	11	8_3	9	10
18	17	15	12	9	7_3	7_4	7_4	9	10
19	16	12	9	5_3	4_4	5_4	6_4	8_3	9
22	19	16	10	3_4	5_1	6_1	7_3	8_3	10
20	16	12	7_1	5_4	6_1	6_4	7_1	8_3	10
18	15	11	9	7_3	7	7_3	8_3	10	11
20	17	14	11	12	10	9	10	11	13

Little assistance in detecting excrescences on the bottom is afforded by the eye, when sounding in a boat, even in clear water, on account of the observer being within five feet of the surface; none in turbid seas. If, therefore, there is no inequality in the soundings to cause suspicion, a shoal patch between two lines may escape detection.

Thus, in a chart on a scale of one inch to the mile, an inequality of some acres in extent rising close to the surface, if it happened to be situated between two lines, might escape detection; whilst in a chart on a scale of 6 inches, inequalities as large as battleships, if lying parallel with, and between the lines of soundings, might exist without detection if they rose abruptly from an otherwise even bottom.

General coast charts should not, therefore, be looked upon as infallible, and a rocky shore should on no account be approached within the ten-fathom contour line, without taking every precaution to avoid a possible danger; and even with surveys of harbours on a scale of 6 inches to the mile vessels should avoid, if possible, passing over charted inequalities in the ground, as some isolated rocks are so sharp that the lead may not find the highest part. Better results can, however, be obtained by sonic sounding owing to the rapidity with which such soundings can be taken, but even this method will not find rocks unless the boat or vessel be directly over them.

Blank spaces among soundings mean that no soundings have been obtained in these spots. When the surrounding soundings are deep it may with fairness be assumed that in the blanks the water is also deep; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks should be regarded with suspicion.

Soundings in hair line, which are shown on the latest charts in upright figures, and on other charts in sloping figures, indicate that such soundings have been taken from smaller scale charts, an unreliable source, or adapted from old and imperfect surveys.

(2) **Fathom lines a caution.**—Except in plans of harbours that have been surveyed in detail, the six-fathom line on most Admiralty charts is to be considered as a caution or danger line against unnecessarily approaching the shore or bank within that line, on account of the possibility of the existence of undiscovered inequalities of the bottom, which nothing but an elaborate detailed survey could reveal. In general surveys of coasts or of little frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for such a detailed survey. It is not contemplated that ships will approach the shore in such localities without taking special precautions.

The ten-fathom line is, on rocky shores, as before mentioned, another warning, especially for ships of deep draught.

Charts on which no fathom lines are marked must be especially regarded with caution, as it generally means that soundings were too scanty and the bottom too uneven to enable them to be drawn with accuracy.

Isolated soundings, shoaler than surroundings depths, should always be avoided as there is no knowing how closely the spot may have been examined.

(3) **Chart on largest scale always to be used.**—It sometimes happens that from press of work, only the copper plate of the larger scale chart of a particular locality can at once receive any extensive re-arrangement of coastline or sounding. This is an additional reason,

besides the obvious one of the greater detail shown, why this largest scale chart should always be used for navigating.

(4) **Caution in using small-scale charts.**—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards on a large-scale chart, whereas on a small scale the same amount of displacement means large fractions of a mile.

For the same reason bearings to near objects should be used in preference to objects farther off, although the latter may be more prominent, as a small error in bearing or in laying it down on the chart has a greater effect in misplacing the position the longer the line to be drawn.

(5) **Graduation.**—All plans are now being graduated in skeleton style before publication in order to facilitate easy reference to geographical positions; previously published plans are also graduated as opportunity offers. The graduation is, however, of necessity often based upon imperfect information of a conflicting nature; for this reason, whenever a geographical position is quoted other than approximate (i.e., when seconds are given), it is necessary to quote also the number of the particular chart from which the position has been derived.

In this connection it is pointed out that, whenever possible, a position should be transferred from one chart to another by bearing and distance from a distinguishing feature common to both, such as a point of land or a light, &c., and not by the graduation which may differ owing to one of the charts being constructed on later and more complete geographical data than the other.

(6) **Distortion of printed charts.**—The paper on which charts are printed is, from various causes, subject to distortion, but the effect of this is seldom sufficient to affect navigation. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree when carefully plotted upon the chart, especially if the lines are to objects at some distance. The larger the chart the greater the amount of this distortion.

(7) **Buoys.**—It is manifestly impossible that any reliance can be placed on buoys always maintaining their exact position. Buoys should, therefore, be regarded as warnings and not as infallible navigating marks, especially when in exposed positions; and a ship should always, when possible, be navigated by bearings of fixed objects on shore or angles between them, and not by buoys.

(8) **Light-buoys.**—The lights shown by light-buoys cannot be implicitly relied on, as, if occulting or flashing, the apparatus may get out of order, or the light may be altogether extinguished. These lights in the British isles are from 5 to 217 candle-power.

(9) **Cable-buoys.**—Cable-buoys marking the ends of submarine cables usually are spherical or can-shaped, surmounted by a globe and occasionally a flag. Below the topmark two *white fixed* lights, disposed horizontally, may be exhibited, but they cannot be implicitly relied on.

(10) **Lights.**—Arcs drawn on charts round a light are not intended to give information as to the distance at which it can be seen, but solely to indicate, in the case of lights which do not show the same characteristics or colours in all directions, the bearings between which the differences occur.

All the distances given in the Admiralty List of Lights and on the charts for the visibility of lights are calculated for a height of an observer's eye of 15 feet. The table of distances visible due to elevation, at the beginning of each volume of the Admiralty List of Lights, affords a means of ascertaining how much more or less the light is visible should the height of the eye be more or less. The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Again, refraction may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light at night, the fact is often forgotten that from aloft the range of vision is much increased, By noting a star immediately over the light a very correct bearing may be afterwards obtained from the compass.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by remarking its candle power, as given in the Admiralty List of Lights, and in some cases by noting how much its visibility in clear weather falls short of the range due to the elevation at which it is placed. Thus, a light standing 200 feet above the sea, and only recorded as visible at 10 miles in clear weather, is manifestly of little brilliancy, as its elevation would permit it to be seen over 20 miles, if of any power. (*See* table in the Admiralty List of Lights.)

The distance from a light cannot be estimated either by its brilliancy or its dimness.

On first making a light from the bridge, by at once lowering the eye several feet and noting whether the light is made to dip it may be determined whether the vessel is in the circle of visibility corresponding with the usual height of the eye or unexpectedly nearer the light.

(11) **Fog signals.**—Sound is conveyed in a very capricious way through the atmosphere. The following points in regard to fog signals should be borne in mind:—

(*a*) Fog signals are heard at greatly varying distances.

(*b*) Under certain conditions of atmosphere, when an air fog signal is a combination of high and low tones one of the notes may be inaudible.

(*c*) There are occasionally areas around a fog signal in which it is wholly inaudible.

(*d*) A fog may exist a short distance from a station and not be observable from it, so that the signal may not be sounded.

(*e*) Some fog signals cannot be started at a moment's notice after signs of fog have been observed.

Mariners are therefore warned that fog signals cannot be implicitly relied upon, and that *the practice of sounding should never be neglected.* Particular attention should be given to placing "Look-out men" in positions in which the noises in the ship are least likely to interfere with the hearing of the sound of an air fog signal; as experience shows that, though such a signal may not be heard from the deck or bridge when the engines are moving, it may be heard when the ship is stopped, or from a quiet position. It may sometimes be heard from aloft though not on deck.

Great assistance may be obtained from radio beacons at many important lighthouses and light-vessels, but the attention of Mariners is called to the serious dangers which may arise from their misuse. No attempt should be made to approach such a position on a radio bearing, whilst relying only on hearing the sound fog signal in sufficient time to alter course to avoid danger. When the radio fog signal is transmitted from a light-vessel, it is essential in order to avoid collision, that the bearing from the light-vessel should not be kept constant.

(12) **Tides.**—In navigating coastal waters where the range of the tide is considerable, caution is always necessary. The tidal predictions for Standard ports in the Admiralty Tide Tables can generally be relied upon to give the times of high and low water to within a few minutes, and heights within a few tenths of a foot. Larger errors are to be expected in the predictions for places which are not Standard ports, computed from the data in Part II, but such predictions computed from the harmonic constants are always sufficiently accurate for the general requirements of navigation. For Standard ports the heights of the tide at times between high and low water may usually be found within narrow limits in accordance with the instructions in Parts I and III of the Tide Tables.

The datums of Admiralty charts depending on Admiralty surveys vary with the type of tide, but usually conform with the International agreement, that datum should be " a plane so low that the tide will but seldom fall below it." The datums used by different nations, however, differ very considerably and those of Admiralty charts depending on foreign surveys are always those used by the original surveyors, which vary from " lowest possible low water " to " mean low water " in tidal waters, and are usually mean sea level in non-tidal waters.

The datum used is always stated on large-scale Admiralty charts.

Caution.—Most datums are above the lowest level to which the tide may fall; the charts therefore do not always show minimum depths.

(13) **Tidal streams.**—Where the tidal streams are semi-diurnal information regarding them is usually given, in a convenient part of the chart, in tabular form or by notes, special symbols being inserted at the positions to which the information refers. In certain cases, where the information available is incomplete, the streams are indicated by means of arrows.

There are many places where the tidal streams cannot be predicted by reference to the tide at a Standard port. Although no data for predicting the times at which they flow is given, their general direction is, in many cases, indicated by arrows on the charts. For a few of the straits and channels, where these conditions exist, tidal stream predictions are given in Admiralty Tide Tables.

Tidal streams, particularly if rotary, may vary considerably both in direction and rate; predictions of the stream must therefore always be considered approximate.

The turn of the tidal stream is not usually coincident with the times of high and low water; in fact, though in estuaries, harbour entrances, &c., the stream usually turns at about the times of high and low water, in open channels, and along open coasts generally, the turn usually occurs more nearly at half-tide. Predictions of the times of high and low water must therefore never be used as predictions of the times of slack water.

It should be remembered that, even where the general direction of the stream is parallel with the shore, an indraught is usually experienced when crossing the entrances to bays and inlets.

(14) **Fixing positions.**—For further information on this subject, *see* Admiralty Manual of Navigation.

When in sight of land, every opportunity should be taken of fixing the ship's position by terrestrial objects.

(*a*) *Simultaneous bearings or angles.*—The most usual method is by compass bearings of suitable objects, and it must be borne in mind that a fix by only two bearings is liable to error, either an absolute error in taking the bearings, or those made in applying the deviation or in laying the bearings off on the chart. For these reasons, a third or check bearing of some other object should, when possible, be taken, especially when near the shore or dangers. The coincidence of the resulting three lines will prevent any mistakes if the objects are suitably placed.

The position may also be fixed by observing horizontal sextant angles of well-defined suitably placed objects. These angles may be plotted on the chart with a station-pointer. Two conditions are, however, necessary to its successful employment; first, that the objects be well chosen; and, second, that the observer is skilful and rapid in his use of the sextant and station-pointer. For the former, reference can be made to the pamphlet on the use of the station-pointer, or to the Admiralty Manual of Navigation; the latter is only to be obtained by practice.

It will readily be seen that a sextant often offers advantages, as angles can be obtained from any position whence the objects are visible, and the fix is in no way dependent on the compass.

In many narrow waters also, where the objects may yet be at some distance, as in coral harbours or narrow passages among mud banks, navigation by sextant and station-pointer is invaluable, as a true position can only be obtained by its means. A small error in either taking or plotting a bearing under such circumstances may put the ship ashore.

In all cases where great accuracy of position is required, such as the fixing of a rock or shoal, or the addition to a chart of fresh soundings or new buildings, angles should invariably be used. In such cases angles should be taken of a number of objects, five being a good number, since this not only fixes the position beyond doubt, but also affords a useful check on the accuracy of the chart itself. When running a line of soundings it is only necessary to take a third angle every now and then, firstly to make certain that the more important soundings, as at the end of a line, are correctly placed, and secondly to check the general accuracy of the chart.

Sometimes when only one of the selected objects is visible from the compass, a compass bearing of it and a sextant angle to the other may be used to fix the position.

(*b*) *Simultaneous bearing and distance.*—Attention is also directed to the very useful and handy method of fixing by the bearing and distance of a suitable object.

Should the ship be suppplied with ranging equipment, its use here is obvious, but without it a very good approximate distance of an object of known height may be obtained by observing its angle of elevation and obtaining its distance from Lecky's Offshore Distance Tables, which are supplied with all sets of charts. Full directions for the use of these Tables are given with them.

(*c*) *The running fix.*—If two position lines are obtained at different times the position of the ship may be found by transferring the first position line up to the time of taking the bearing for the second position line. The point of intersection of the second and the transferred position line is the ship's position at the time of the second observation.

The accuracy of this fix will depend on the accuracy of the estimated run (over the ground) between bearings and, therefore, it is essential to take great care that an accurate allowance is made for tidal stream, current, and leeway experienced by the ship during this interval.

The method of fixing by doubling the angle on the bow is useful when passing points of land, &c., in waters where there is either no tidal stream or current, or where this can be estimated with sufficient accuracy.

This method is as follows:—

Suppose that the angle between the ship's head and an object is measured, and found to be X°, and that the time of the observation is noted. Suppose also that the time is again taken when the angle between the ship's head and the object is 2X°. Then, if the course made good is the course steered, the distance of the ship from the object at the time the second bearing was taken is equal to the run (over the ground) in the interval. Hence the ship's position can at once be laid off as a bearing and distance from the object. In practice the angle X should not be less than about 25°.

The most usual form of this method, the so-called "four-point" bearing, gives a good fix for a departure, but does not ensure safety, as the point and any dangers that may lie off are abeam before the position is obtained.

The above fix is reliable when there is no tidal stream or current or when it runs directly with or against the course of the ship. When the stream or current runs across the course of the ship or when leeway is to be allowed for, this method should never be used and the ship's position should be obtained by plotting the two bearings as a running fix.

A table "Distance of an object by two bearings" is supplied with certain chart folios, and is also given in Inman's Tables, by which the ship's position at the second bearing can be found: any two bearings at a suitable angle to each other may be used, together with the run between them, but, again, this table should not be used when the vessel is subject to a cross tidal stream or leeway.

(*d*) *The danger angle.*—The use of the danger angle in passing outlying dangers with land behind them should also not be forgotten.

A vertical danger angle is useful when the danger lies off an object such as a lighthouse, the height of which is known; the angle being obtained from the aforesaid Lecky's Tables. If a horizontal danger angle between two objects is used, however, caution is necessary, as, should the objects not be correctly placed on the chart, the angle taken from it may not serve the purpose. This method should not, therefore, be employed when the survey is old or manifestly imperfect.

(*e*) *The astronomical position line.*—When fixing by astronomical observations, attention is drawn to the great utility of the position line. Even a single position line may at times give invaluable information, as the ship must be somewhere on this line, provided that the chronometer error is accurately known.

A sounding obtained at the same time may often serve to give an approximate position. Again, by steering along, or at a required distance parallel to, a single position line, a vessel may make her port or avoid a danger, although uncertain of her position.

A very accurate position may be obtained by observations of three or more stars at evening or morning twilight, or by the observation of a bright star at daybreak and another shortly afterwards of the sun when a few degrees (not less than 10°) above the horizon. The position lines obtained from the bodies observed should differ in azimuth by 30° or more.

Mariners are also reminded that, with modern tables for correcting the altitude, observations of the moon entail practically no more calculation than those of a planet. Moon sights are somtimes available when stars are obscured by light cloud, &c.; also, an excellent position may frequently be obtained by simultaneous observations of the sun and moon.

(*f*) *The radio position line.*—A number of radio systems of which the principal ones are M/F D/F, Radio Beacons, Consol Beacons, Loran, Gee and Decca, are now in general use from which position lines or fixes may be obtained.

The accuracy and range which may be obtained from these systems vary considerably; their great advantage over other methods lies in the fact that they can be employed under all weather and visibility conditions, though in some cases the results obtained will vary between day and night.

Special receiving equipment is generally required in order to make use of the radio signal, and some systems require special lattice charts or tables for plotting the position lines. Full details of these systems and their coverage areas are contained in Admiralty List of Radio Signals, Volumes II and V.

The mariner should appreciate that with the position-fixing systems the accuracy of a fix will depend on three factors:—

(i) The distance of the observer from the transmitters.

(ii) The bearing of the observer from the base line joining the pair of stations which he is using.

(iii) The angle of intersection of the hyperbolic position lines.

It should be apparent from the inspection of any lattice chart that an inherent small equipment error, or a small personal error that may occur at the receiver, will cause a geographical error of varying amount according to the observer's position.

It is important to realise that accurate equipment is no guard against the vagaries of the propagation of radio waves. The beacons and systems operating on medium and low frequencies are liable to " night error " in areas where the ground and sky waves are received with equal strength; these areas will occur at ranges depending upon the particular frequency used by any beacon or system. Where the transmissions of two stations are synchronised to provide one signal reading and position line, " night error " will be a minimum along the normal to the base line joining the pair of stations, and a maximum towards the limits of their service sector.

Little is yet known about the effects of hills and discontinuities in the terrain (such as cliffs) on the speed of medium- and low-frequency radio waves.

At the other end of the radio spectrum the transmissions of systems operating on the very high frequencies are subject to distortion in abnormal atmospheric conditions.

(*g*) *Fixing by radar.*—Radar may also be of considerable assistance when navigating in coastal waters in low visibility or at night. It is essential, however, to appreciate the limitations of a radar set when interpreting the information obtained from it. It must be remembered that the radar horizon is only slightly farther than the visual horizon would be, in good visibility, for a height of eye equal to the height of the radar aerial. Hence no echoes will be received from a coastline lying below the radar horizon, while echoes may be received from high ground farther inland which will give a misleading impression of the range of the nearest land.

Depending on the width of its beam, the bearings from a radar set tend to be inaccurate. It is therefore preferable when fixing by radar to use ranges rather than bearings. It is then most important to consider carefully the identity of the object giving the echo, using the bearing as an indication, and the height of the object to determine whether it will appear on the radar presentation. Radar Range Nomograms are useful in deciding this, but a satisfactory result can be obtained by using " Distance to Sea Horizon Tables."

When two or more objects on the radar presentation have been selected and positively identified, a satisfactory fix can be obtained by striking arcs on the chart with the radar range of the selected objects. These arcs intercept at the ship's position. Best results will be obtained by using isolated objects such as detached lighthouses, rocky islets, and the extremities of long piers or jetties, but where no such objects are available a steep coastline with cliffs should be used. Flat or gently shelving coastlines, such as mud flats or sand dunes, should not be used since it is difficult to identify any portion of them on the radar presentation. Identification is assisted in some areas by fitting objects, such as buoys and beacons, with radar reflectors, causing them to return strong echoes. Attention is drawn to the symbols with which such objects are marked on Admiralty Charts, and which are given in the latest edition of Chart No. 5011, " Explanation of signs and abbreviations used on Admiralty Charts."

The difficulty of positive identification of objects is largely reduced if a Chart Comparison Unit is used in conjunction with the navigational radar. Fixes obtained with this equipment employ, in principle, an infinite number of ranges of the terrain in the vicinity of the ship, and in so doing a satisfactory fix will normally be assured.

In addition, radar beacons are available in some areas. Details of these and their use are given in the Admiralty List of Radio Signals, Volume II.

(15) **Observations for errors of the compass.**—No opportunity should be neglected for checking the error of the compass. When coasting, and a well-surveyed and fairly large-scale chart is available, an excellent method of observing the error is by taking the compass bearing of two suitable objects when in transit, and comparing this with the charted bearing; there should be sufficient distance between the objects to provide a sensitive transit. When this method is not available the error should be obtained by azimuths of a heavenly body. Errors should be observed on any change of course on which the ship is steadied for a reasonable time, and at least twice a day when steering a steady course for long periods.

(16) **Change of variation of the compass.**—The gradual change in the variation must not be forgotten in laying down positions by bearing on charts. The magnetic compasses placed on the charts for the purpose of facilitating plotting become in time slightly in error, and in some cases, such as with small scales, or when the lines are long, the displacement of position from neglect of this change may be of importance. The compasses are re-engraved when the error amounts to a degree, but the chart plates cannot be corrected more frequently from the impossibility of making alterations often on one spot in a copper plate.

The geographical change in the variation is in some parts of the world sufficiently rapid to need consideration. For instance, in approaching Halifax from Newfoundland the variation changes 10°

in less than 500 miles, and in the English channel about 5° in 400 miles. The Variation chart should be consulted on this head.

On certain general charts embracing large areas with considerable change of variation, true compasses are placed instead of magnetic compasses, the variation being shown by *isogonic lines* (curves of equal magnetic variation), in a similar manner to the Variation chart. One or two *isogonic lines* are also sometimes placed on charts in addition to the magnetic compasses, in order to indicate the general direction of these curves, and thus facilitate the determination of the variation to be employed in portions of the chart not in immediate proximity to any one of the engraved compasses. Magnetic variation values shown on Admiralty charts are for the 1st July of the year mentioned.

(17) **Local magnetic disturbance of the compass on board ship.**—The term " local magnetic disturbance " has reference only to the effects on the compass of magnetic masses external to the ship in which it is placed. Observation shows that such disturbance of the compass in a ship afloat is experienced only in a few places on the globe. Magnetic laws do not permit of the supposition that it is the visible land which causes such disturbance, because the effect of a magnetic force diminishes in such a rapid proportion as the distance from it increases that it would require a local centre of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

Such deflections of the compass are due to magnetic ores in the bed of the sea under the ship, and when the water is shallow, and the force strong, the compass may be temporarily deflected when passing over such a spot, but the area of disturbance will be small, unless there are many centres near together. Such areas are depicted by a special symbol on charts, and the cause of the magnetic disturbance is referred to as a Local Magnetic Anomaly.

They may also be due to wrecks lying on the bottom in moderate depths, but investigations have proved that, while deflections of unpredictable amount may be expected when very close to such wrecks, it is unlikely that deflections in excess of 7° will be experienced, nor should the disturbance be felt beyond a distance of 250 yards.

It is very desirable that whenever a ship passes over an area of local magnetic disturbance, the position should be fixed, and the facts reported as far as they can be ascertained.

(18) **Use of oil for modifying the effect of breaking waves.**—Many experiences of late years have shown that the utility of oil for this purpose is undoubted, and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil, skilfully applied, may prevent much damage both to ships (especially the smaller classes) and to boats, by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows:—

1. On free waves, i.e., waves in deep water, the effect is greatest.

2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain, as nothing can prevent the larger waves from breaking under such circumstances; but even here it is of some service.

3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use; crude petroleum is serviceable when nothing else is obtainable; but all animal and vegetable oils, such as waste oil from the engines, have great effect.

4. A small quantity of oil suffices, if applied in such a manner as to spread to windward.

5. It is useful in a ship or boat, both when running, or lying to, or in wearing.

6. No experiences are related of its use when hoisting a boat up in a sea-way at sea, but it is highly probable that much time and injury to the boat would be saved by its application on such occasions.

At anchor, when the sea is sufficient to render it difficult to hoist up or in boats, oil bags from forward or from the swinging booms have been found to render the sea alongside comparatively smooth.

7. In cold water, the oil, being thickened by the lower temperature, and not being able to spread freely, will have its effect much reduced. This will vary with the description of oil used.

8. The best method of application in a ship at sea appears to be: hanging over the side, in such a manner as to be in the water, small canvas bags, capable of holding from one to two gallons of oil, such bags being pricked with a sail needle to facilitate leakage of the oil.

The position of these bags should vary with the circumstances. Running before the wind they should be hung on either bow and allowed to tow in the water.

With the wind on the quarter the effect seems to be less than in any other position, as the oil goes astern while the waves come up on the quarter.

Lying to, the weather bow and another position farther aft seem the best places from which to hang the bags, with a sufficient length of line to permit them to draw to windward, while the ship drifts.

9. Crossing a bar with a flood tide, oil poured overboard and allowed to float in ahead of the boat, which would follow with a bag towing astern, would appear to be the best plan. As before remarked, under these circumstances the effect cannot be so much trusted.

On a bar with the ebb tide it would seem to be useless to try oil for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside. The effect in this case must greatly depend upon the set of the current, and the depth of the water.

11. For a boat riding in bad weather from a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil is diffused well ahead of the boat, and the bag can be readily hauled on board for refilling if necessary.

12. Towing a vessel in a heavy sea, oil is of the greatest service, and may prevent parting the hawser. Distribute from the towing vessel forward and on both sides; if used only aft the tow alone gets the benefit.

(19) Mirage and abnormal refraction.—An unusual lapse rate of temperature (and therefore density as well) with height immediately above the sea (or land) surface produces a distortion in the appearance of objects near the horizon; such a phenomenon is known as mirage.

When the surface is relatively cold (and the wind very light) so that the density of the air decreases rapidly for a short distance above the surface, light rays from objects low down near the horizon are bent down, the same way in fact as are usually the rays of the sun when entering the earth's atmosphere at a low altitude. The effect is to render visible objects that are normally below the horizon, e.g., lights may be " raised " at night at much greater distances than one would ordinarily expect. This phenomenon is known as " looming."

A further occasional effect produced when the air is appreciably warmer than the sea, is " superior mirage " in which an inverted image is seen over the real object; sometimes an erect image is seen immediately above and touching the inverted one. The object and its images in this instance are well defined in contrast to the shimmering object and image of the inferior mirage. Superior mirage is most often experienced in high latitudes and wherever the sea surface temperature is abnormally low.

" Inferior mirage," the effect of which is to decrease the distance at which objects are visible in a horizontal direction, is due to a rapid increase of density with height close to the surface such as occurs when air of comparatively low temperature blows over a warmer sea, or over a tarred road or desert when a hot sun is beating down on it. In either event light rays are bent up when approaching the surface where the density of the air is much less than above. The coastline, and at times a ship or island, may appear to be floating in air above a shimmering horizon, possibly with, in the former instance, her hull either invisible or with an inverted image underneath. Inferior mirage is comparatively uncommon at sea and is more likely to be observed along a coastline than well out to sea.

When mirage is evident caution must be used in taking sights with a sextant, for abnormal refraction must necessarily be present also. With inferior mirage better, but not normal, results will usually be obtained by ascending as high as possible in the ship; with superior mirage the height of eye should be as low as possible. It is, however, advisable, whenever abormal refraction is suspected, to measure the elevation of the celestial body above the back as well as the front horizon as explained in navigational text-books.

(20) Aurora.—The most common form of aurora is an arc system, single or multiple, narrow and well defined, or broad and diffuse, and centred on the magnetic meridian.

The most usual colour is pale whitish green when the auroral activity is weak and diffuse: but when the aurora arises high towards the zenith in the form of rays, rayed curtains and draperies with much rapid movement of the constituent rays, the colours sometimes become much stronger and more vivid, and include bright green, red and violet. When the curtains forming the aurora converge to form a corona, which may rotate very rapidly about the point of convergence, the displays may become very complex, filling practically the whole sky, and extending far to the equatorial side of the zenith with much rapid movement and change of colour from instant to instant.

Though the most usual duration of auroral displays in these high latitudes is several hours, they not infrequently last throughout the whole night from dusk to dawn. In such long displays the really intense and violently active periods with vivid strong colours are generally confined to spasms of 15-30 minutes, with the intervening periods filled with diffuse glows or quiet arc systems.

The absolute intensity of the light of the aurora is seldom great, and the brighter stars usually glimmer through it. In the most vivid and intense displays, the light may equal, but rarely surpasses, that of the full moon in a cloudless sky. It may give enough light to read by. On such occasions the aurora may be visible to some extent in partial twilight.

Though in high latitudes aurora occurs any time in the dark hours it is probably most frequent in the late evening hours from 9 p.m. till midnight or just after; it is more frequent in the equinoctial months than at other times and has a well-defined 11-year period of activity following the cycle of solar activity. A maximum of activity occurred in 1948, and the interval from maximum to minimum activity usually occupies a period of about 6 to 7 years. In high latitudes this cycle of activity is reflected more in the intensity and vividness of the displays than in the frequency of occurrence. Though really outstanding displays tend to occur around the years of maximum activity they may occur at any time of the cycle, except perhaps near the absolute minimum.

In addition to this 11-year cycle of activity active periods tend to recur at intervals of 27 days, *see* Magnetic Storms.

Northern hemisphere.—Aurora Borealis occurs most frequently along a zone which forms an approximate oval, of average radius 23°, with centre in the extreme north-west of Greenland. This zone of maximum frequency crosses Hudson Bay and the Labrador coast in about lat. 58° N. It runs south of Cape Farewell and along the south coast of Iceland. It lies just north of North Cape, touches the extreme north of Novaya Zemlya, skirts Cape Chelyuskin and then eastward just north of Wrangel Island into the north of Alaska. Along this zone aurora of some kind can probably be seen every suitable night when the sky is clear; 250 miles outside this maximum zone to the southward the auroral frequency decreases sharply to about 70-100 nights a year on the average, and to 20-25 nights 500 miles south of the maximum zone. Inside the maximum zone the geographical distribution of frequency is not so well established but it probably falls off more gradually than it does outside.

On the zone of maximum frequency itself aurora appears as frequently to the south of the zenith as to the north, but with increasing distance outside the zone the appearances concentrate more into the northern sky; the reverse is true inside the zone.

Southern hemisphere.—The frequency and distribution of Aurora Australis is not fully known. It is probable that it is more frequently seen at sea between about long. 50° E. and 175° W. than in other longitudes. Very fine displays have occasionally been seen in Australasia and on passages across the Southern Ocean. There is nevertheless a general impression that aurora is less frequent in the southern than in the northern hemisphere. This is probably to be accounted for by the fact that, apart from whaling and exploring expeditions, ships' tracks in general do not extend to such high latitudes as in the northern hemisphere.

The zone of maximum auroral frequency is roughly annular and is near the circumference of a circle of radius about 1,080 miles, centred in about lat. 75° S., long 129° E. The frequency falls off both outside and inside this zone. A large part of the zone is within the continent of Antarctica.

(21) **Magnetic storms.**—Magnetic storms vary in intensity and frequency with the sunspot cycle, similarly to aurorae. An intense magnetic storm is always accompanied by a bright and active aurora. The deeply coloured aurorae, showing more pronounced red and green, and sometimes also blue and violet, tints, are invariably connected with magnetic storms of considerable or great intensity. Such a storm will produce simultaneous aurora in both hemispheres. In the greatest storms aurorae in some form may be visible down to about 20° north latitude in certain parts of the oceans, especially

between the meridians of 30° W. and 140° W. Magnetic storms vary greatly in duration from a few minutes to several days; they are generally more intense during the hours of darkness. Long-continued storms usually show great fluctuations with periods of complete or partial quiescence. Similarly the associated aurora fluctuates between active and quiescent forms.

The origin of magnetic storms and aurorae is not yet fully understood, but they are intimately connected with the state of a local area of the sun. As the same part of the sun is again presented to the earth after an interval of about 27 days, a magnetic storm and aurora may recur at this time, usually in less intense form.

A ship's compass may tend to deviate during the progress of a considerable magnetic storm. In more intense storms the compass needle may oscillate 1° or more either side of its normal position. Such oscillation may persist for as long as 10 or 20 minutes before dying out. Further oscillation may occur after a period of quiescence. Deviations of 2° or more are rare, but during the great magnetic storm and aurora of January 25th, 1938, one of 4° to the eastward was observed off the Portuguese coast. During a severe magnetic storm the compass may be deflected continually in one direction to the extent of about half a degree for some hours. When bright aurora is seen, especially if it is of the more deeply coloured and rapidly moving kind, and particularly when it is observed in low latitudes, the possibility of deflections of the compass should always be borne in mind.

During a considerable magnetic storm freak wireless reception may occur on certain waves and short-wave transmission may fade to complete silence. Beam radio communication, especially in a west-east or east-west direction, may be interrupted. Such conditions may last in some degree over a period of several days, at times when the sun is unusually active. Short-wave fading also occurs occasionally from a different form of solar disturbance known as a "bright eruption," when this is very intense. On the average such fading begins about 7 minutes after occurrence of the bright eruption and may last 5 or 10 minutes, gradually returning to normal within a period of 40 to 45 minutes. These fadings are confined to the daylight hemisphere of the earth, while the magnetic storm fadings may occur by day or by night.

GENERAL METEOROLOGY.

(All the following articles do not apply to every Pilot, but articles applicable to this Pilot will be referred to in the Climate and Weather Section in Chapter I.)

(1) **Lows.**—A low, or depression, appears on a synoptic chart as a series of isobars roughly circular or oval in shape, surrounding an area of low pressure. It is a main feature of the weather at sea in middle latitudes where it is responsible for most of the occasions of strong winds and unsettled weather, though not all depressions are accompanied by strong winds.

Lows vary very much in size and depth; one may be only a hundred miles in diameter and another over two thousand miles; some are deeper than others, a deep low being one in which the pressure is very much lower near the centre than on the outside whereas, on the other hand, a shallow depression is one where the pressure, although low near the centre, is not very much lower than in the surrounding districts.

Note.—The bracketed equivalents hereunder refer o the Southern Hemisphere.

In the northern (southern) hemisphere the winds blow round an area of low pressure in an anti-clockwise (clockwise) direction; there is also a slight inclination across the isobars towards the lower pressure. Thus the well-known rule for the northern (southern) hemisphere is that when an observer faces the wind the direction of the lowest pressure is from 8 to 12 points to his right (left). The strength of the wind is in all instances closely related to the steepness of the barometric gradient or distance apart of the isobars; the closer the isobars the stronger the wind.

Lows may move in almost any direction, though most often towards north-east (south-east) or east, at a speed of anything between 10 and 40 knots, though occasionally as much as 60, during the middle and most active stage of their existence; they slow down when filling up (*see* " occlusion " below). The life of a low is in the region of 4 to 6 days.

There are usually one or more fronts, probably radiating from the centre, in the area covered by a low; each front on a synoptic chart represents a belt of relatively bad weather, accompanied by a veer (backing) of wind, which marks the change from the weather characteristic of one air mass to that of another. During the first two or three days of its life a low has a warm and a cold front, the area between the two being known as a warm sector because the air has come from a warmer locality than that which is outside the sector (*see* Fig. 1*a*). Warm air is lighter than cold air and it rises over the cold air ahead of the warm front as shown in Fig. 1*b*; this causes condensation of the water vapour in the warm air, forming at first cloud and later drizzle or continuous steady rain. The cloud spreads out ahead of the warm front, and the highest cloud, cirrus or mares' tails, is often about 500 miles ahead. At the rear boundary of the warm sector, known as the " cold front," the cold air is pushing under the warm air forcing the latter to ascend rapidly; this process is sometimes violent enough to produce squalls. The rapid ascent of the warm air causes the moisture to condense in the form of cumulo-nimbus clouds (shower clouds), from which heavy showers may fall. The cold front gradually overtakes the warm front so that the warm sector is eventually lifted up from the earth's surface. When this has occurred the low is said to be occluded, and the warm and cold fronts have merged into the third type of front known as an " occlusion " (*see* Figs. 2*a* and *b*). When a low has become occluded, it usually decreases in intensity and rate of travel, and gradually fills up. On the other hand, a low which has a marked warm sector is likely to be deepening, the winds associated with it may increase in force and its rate of travel may increase. Lows are usually travelling in a direction approximately parallel to the isobars (and in the direction of the wind) in the warm sector.

The approach of a low is indicated by a falling barometer. In the northern (southern) hemisphere, if the low is approaching from westward and passing northward (southward) of the ship, clouds appear on the western horizon, the wind shifts to a south-westerly (north-westerly) or southerly (northerly) direction and freshens, the cloud layer gradually lowers, and finally drizzle, rain or snow begins. If the low is not occluded, after a period of continuous rain or snow there is a veer (backing) of wind at the warm front, a rise of temperature and diminution or cessation of rain (or snow) in the warm sector, the visibility being usually moderate and the sky overcast with low cloud.

The passage of the cold front is marked by the approach from westward of a thick bank of cloud (which however cannot often be seen because of the customary low overcast sky in the warm sector), a further veer (backing) of wind to west or north-west (south-west), sometimes with a sudden squall, rising pressure, a fall of temperature, squally showers of rain, hail or snow, and improved visibility (except during showers). The squally showery weather with a further veer (backing) of wind and drop in temperature may recur while the low recedes owing to the passage of another cold front or occlusion. If the low is occluded, the occlusion is preceded by the cloud of the warm front; there may be a period of continuous rain mainly in front of and at the line of occlusion, or a shorter period of heavy rain mainly behind the occlusion, according as the air in front of the occlusion is colder or warmer than that behind it. There may be a sudden veer (backing) of wind at the occlusion.

Often another low follows 12 to 24 hours later, in which event the barometer begins to fall again and the wind backs towards south-west (north-west), or even south (north).

If a low travelling eastward or north-eastward (south-eastward) is passing southward (northward) of the ship, the winds in front of it are easterly and they back (veer) through north-east (south-east) to north (south) or north-west (south-west); changes of direction are not likely to be so sudden as on the southern (northern) side of the low. In the rain area there is often a long period of continuous rain and unpleasant thick weather with low cloud. In winter in the colder regions the weather is cold and raw and precipitation is often in the form of snow.

Near the region of lowest pressure, lulls are sometimes experienced, but sudden changes are likely, and in a deep low the wind may increase in strength very rapidly, perhaps to gale force as the barometer begins to rise.

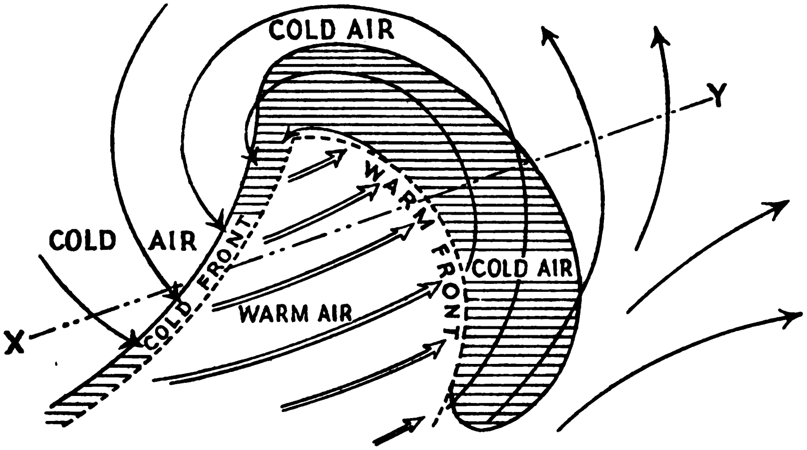
Sometimes in the air circulation of a large low, usually on the equatorial side and often on a cold front, a secondary depression develops, travelling in the same direction as the primary but usually more rapidly. The secondary often deepens while the original low decreases in intensity. In the region between the primary and the secondary depressions, the winds are not as a rule strong; but on the further side of the secondary, usually the southern (northern) side, winds are likely to be strong and they may reach gale force. Thus the development of a secondary may cause gales at a greater distance from the primary than anticipated, while there may be only light winds where gales were expected.

The above is a brief general description of lows and the associated weather in temperate or middle latitudes of the northern (southern) hemisphere. It must be emphasised, however, that individual lows in different localities differ considerably from one another, according to the characteristics (especially the temperature and humidity) of the air currents of which they are composed, and the nature of the surface over which they are travelling.

(2) **Tropical revolving storms.**—*Practical rules for avoiding them.*—These storms are so named because the wind blows round an area in which the lowest pressure is at the centre. The direction of rotation is anti-clockwise in the northern hemisphere and clockwise in the southern hemisphere. The wind does not revolve round the centre of low pressure in concentric circles but has a spiral movement inwards, towards the centre of the storm field.

NORTHERN HEMISPHERE.

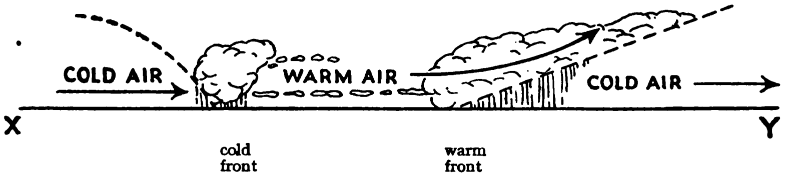
Fig. 1a.



Plan of a developed depression.

The double lines show the flow of the warm air, and the single lines the flow of the cold air.
The shading shows the area where rain (or snow) is most probable.
Width of rain belt ahead of warm front is generally between 100 and 200 miles.

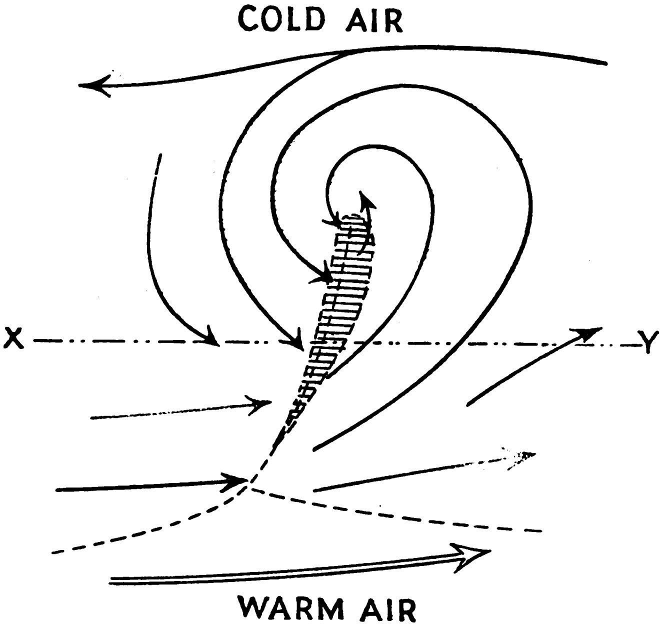
Fig. 1b.



Vertical section of the depression along the line XY.

[*See over page.*

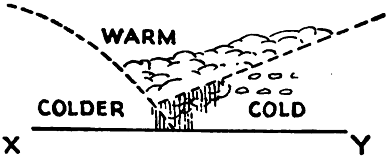
Fig. 2a.



Plan of an occluded depression.

The shading shows the region where rain (or snow) may be expected near the occlusion.

Fig. 2b.

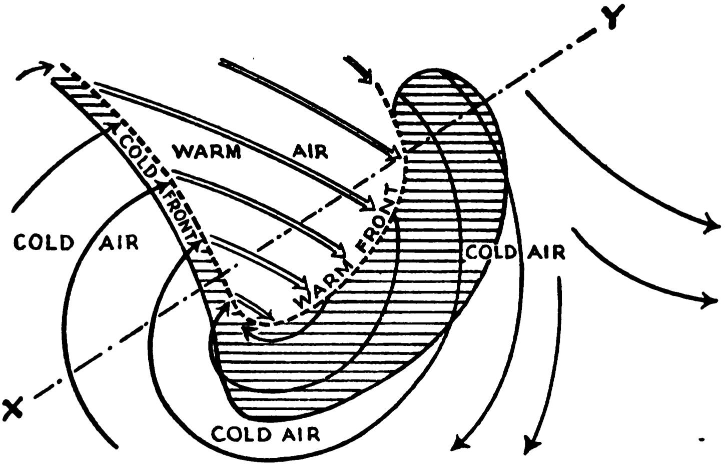


Vertical section of an occlusion of the cold front type.

The air in front of the occlusion is warmer than the air behind it.

SOUTHERN HEMISPHERE.

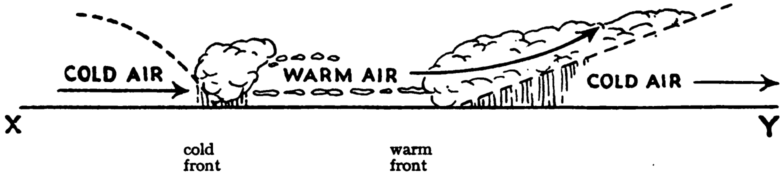
Fig. 1a.



Plan of a developed depression.

The double lines show the flow of the warm air, and the single lines the flow of the cold air.
The shading shows the areas where rain (or snow) is most probable.
Width of rain belt ahead of warm front is generally between 100 and 200 miles.

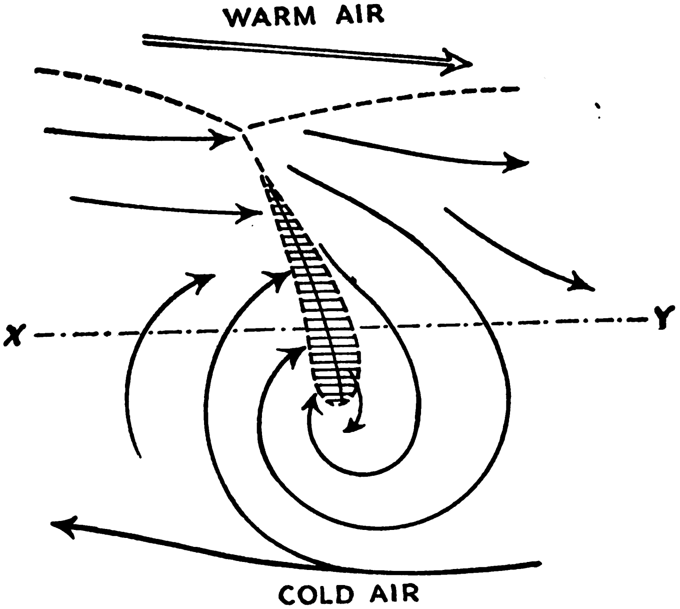
Fig. 1b.



Vertical section of the depression along the line XY.

[*See over page.*

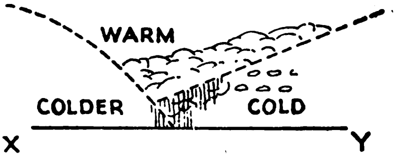
Fig. 2a.



Plan of an occluded depression.

The shading shows the region where rain (or snow) may be expected near the occlusion.

Fig. 2b.



Vertical section of an occlusion of the cold front type.

The air in front of the occlusion is warmer than the air behind it.

A tropical storm is not so extensive as the depression of higher latitudes but, within 75 miles or so of the centre, the wind is often far more violent, and the high and confused seas near the centre may cause considerable damage to large and well-found ships, while small vessels (for example, destroyers) have foundered. The danger is still greater when ships are caught in restricted waters without adequate room to manœuvre. Within 5 to 10 miles of the centre the wind is light or moderate and variable, the sky is clear or partially so, and there is a heavy, sometimes mountainous, confused swell; this area is known as the " eye " of the storm. After passing through the relatively windless centre of the storm the wind will suddenly, and with great violence, commence to blow from a direction almost opposite to that experienced on the other side of the windless centre. Due to torrential rain and sheets of almost continuous spray, visibility near the storm centre (but outside the " eye ") is almost nil.

Every ship navigating in an area subject to tropical storms during the season of their occurrence should be constantly on the alert for any sign of their approach, so that steps can be taken to avoid the danger zone while there is still time and sea-room.

Localities, season, and average frequency.—Tropical storms occur for the most part on the western side of the oceans, though they are also experienced in the Bay of Bengal, off the north-west coast of Australia, and off the west coast of Central America. They are unknown in the South Atlantic. They are given various names according to the part of the World in which they occur.

Western North Atlantic Eastern North Pacific South Pacific	–hurricanes
Western North Pacific	–typhoons
Indian Ocean Bay of Bengal Arabian Sea	–cyclones
North-west Australia	–willy-willies

They are most frequent during the late summer and early autumn of their hemisphere; they are comparatively rare in the southern hemisphere from mid-May to November, and in the northern hemisphere from mid-November to mid-June. In the Arabian Sea, however, storms are most likely to occur at the change of the monsoon, i.e., October-November, and May-June, though they average only one or two a year. Out-of-season storms occur from time to time, particularly in the western North Pacific where no month is entirely safe, and in the Indian Ocean where one is reported south of the Equator perhaps once in two years outside the usual season. The following table shows approximately the average number of severe tropical storms recorded per annum, from statistics taken over several years for the various areas:—

West Indies	5
Western North Pacific	25
,, South Pacific	3
Southern Indian Ocean	6
Bay of Bengal	2
Arabian Sea	1
Eastern North Pacific	3
West Coast of Australia	1

Variations in any one year amounting to 50% above or below the average are not unusual. Some of the figures quoted are probably an underestimate since in the less-frequented parts of the world many storms must escape detection.

Origin, movement and extent.—Tropical storms originate as a general rule in the doldrums, between the parallels of 7° and 15° of latitude; those which affect the western part of the Pacific, South Indian and North Atlantic Oceans are first reported in the western third of those oceans, though there are exceptions such as in the North Atlantic during August and September where an occasional storm is known to begin near the Cape Verde islands. In the northern hemisphere they move off in a direction between 275° and 350°, though most often within 30° of due west. When in a latitude of 25° or so they usually recurve away from the equator and, by the time they have reached the 30th parallel, the track (or path as it is more usually called) is north-easterly. In the southern hemisphere they move off in a WSW. to SSW. direction (usually the former), recurve at about 15° to 20° S., and thereafter adopt a south-easterly path. In either hemisphere many storms do not recurve but continue in a west-north-westerly (or west-south-westerly) direction until they reach the mainland where they quickly die.

The speed of advance of these storms is usually about 10 knots in their early stages, increasing a little with latitude; it seldom exceeds 15 knots before recurving, but after recurving 20 to 25 knots is usual though speeds of 40 knots or even more have been known.

Occasionally storms move erratically, the path turning towards the equator, or adopting an easterly component in a low latitude, or even making a complete loop, but on these occasions their speed of advance is low, usually less than 10 knots, while the unusual path is being followed.

The extent of the storm area varies considerably with individual storms but, generally speaking, winds of force 7 or more are improbable at more than 200 miles (especially on the equatorial side of the storm area) and force 8 is unlikely to be exceeded at more than 100 miles, from the storm centre, if in a latitude of less than 20°. Thereafter the radius increases with latitude so that these distances are nearly doubled on reaching the 35th parallel, but the intensity diminishes near the centre. Hurricane force winds are likely within 75 miles of the storm centre in the tropics, and gusts exceeding 150 knots have been reported in a few instances within 50 miles or so (except in the eye of the storm). The aim of the mariner should therefore be to remain as far as possible from the centre of the storm system.

Warning of existence or approach.—In most instances, warning of the position, intensity and probable movement of a storm is given by radio at frequent intervals by meteorological authorities ashore. (*See* Admiralty List of Radio Signals, Volume III.) Sometimes, however, there is insufficient evidence available for an accurate warning or even a general warning to be given and ships must then be guided by their own observations. Of the following indications of the proximity of a tropical storm, the first is by far the most reliable within 20° or so of the equator; it should be borne in mind, however, that very little warning may be expected of the approach of an intense storm of unusually small diameter.

(*a*) If the corrected barometer reading is 3 mb. or more below the mean for the time of year, as shown in a climatic atlas or on the appropriate chartlets in the meteorological text of this Pilot, suspicion should be aroused and action taken to meet any development, such as raising steam in any available additional boilers, &c. It should be noted, however, that the barometer reading must be corrected not only for height, latitude, temperature and index error (if mercurial), or for height and index error if aneroid, but also for diurnal variation, the amount of which is given for each hour of the day in the Air Ministry climatic atlases and in the meteorological text of this Pilot. If the reading thus corrected is 5 mb. or more below normal, it is time to take avoiding action for there can be little doubt that a tropical storm is in the vicinity. According to an analysis of observations in the Western Pacific the centre of the storm is then probably not more than 200 miles away. At this distance, at any rate in the China Sea vicinity, the wind has usually increased to about force 6.

When proceeding through an area liable to be visited by these storms it is desirable to take hourly readings of the barometer.

(*b*) An appreciable change in the direction and/or strength of the wind.

(*c*) A swell is sometimes evident, proceeding from a direction that approximates to the bearing of the centre. If ahead of the storm this indication may be apparent before the barometer begins to fall.

(*d*) Extensive cirrus cloud followed, as the storm becomes closer, by much alto-stratus cloud and subsequently fracto-cumulus or "scud."

(*e*) In addition there is the warning that can be given by Radar. The existence of moderate or heavy rain can usually, under favourable meteorological conditions, be detected at the extreme range of centrimetric radar, such as is normally used for navigational purposes afloat, depending on the vertical extent of the rainfall. Subrefraction might decrease and superrefraction increase this range as with any other target. Although moderate or heavy rain does not fall symmetrically all round a storm, it is continuous for at least 50 miles in a broad sector extending from the " eye " of the storm where there is a circular area of relatively light winds and clear or partially clear sky. By the time radar evidence of the exact position of the storm is available, the ship will probably be already in fairly high seas and experiencing winds of force 9 or 10. There should still be time, however, for her to avoid the centre of the storm.

Note.—In accordance with Article 35 of the International Convention for Safety of Life at sea it is the duty of every ship who suspects the presence or formation of a tropical revolving storm immediately to inform other vessels and shore authorities with all the means at her disposal. Weather reports should be made by radio at frequent intervals giving as much information as possible, especially corrected (*not* for diurnal variation as in (*a*) above) barometer readings. If barometer readings are uncorrected this fact should be stated in the signal.

Information required by the seaman before deciding upon action to be taken.—To decide on the best course of action if a storm is suspected to be in the vicinity, the mariner requires to know:—

(*a*) the bearing of the centre of the storm;
(*b*) the semicircle in which the ship is situated;
(*c*) the path of the storm.

If an observer faces the wind, the centre of the storm will be from 9 to 11 points on his right-hand side in the northern hemisphere when the storm is about 200 miles away, i.e., when the barometer has fallen about 5 millibars and the wind has increased to force 6 or thereabouts; as a rule the nearer one is to the centre the more nearly does the angular displacement of the wind approach 8 points. A further check on the bearing of the centre may often be obtained by noting the direction from which the swell is coming. The swell travels approximately directly outward from the storm centre.

The semicircle in which the ship is situated can be determined by taking two such bearings with an interval of from two to three hours between observations, provided that allowance is made for the ship's movement. It can be assumed that the storm is not travelling towards the equator; and, if in a lower latitude than 20°, its path is most unlikely to have an easterly component; and, on the rare occasions when neither of these statements applies, the storm is moving very slowly. (Exceptions to this are most likely in the South Pacific, where occasional storms often move off on a course almost due south developing an easterly component at a latitude of about 15°, and in the western North Pacific where some of the out-of-season storms may recurve at an early stage.)

In a moving ship associated with a storm progressing at an unknown rate, it is very difficult to estimate from an apparent shift of wind the direction and speed of the storm's motion relative to the ship. The surest method of ascertaining the true shift of wind and thereby finding out in which semicircle the vessel is situated, *is to stop the ship during the period between the two bearings*. If in either hemisphere, these observations show that the wind is veering, the ship is in the right-hand semicircle; if the wind is backing she is in the left-hand semicircle; and if the wind remains steady in direction than the vessel is in the direct path of the storm, which is the most dangerous place of all.

The diagram headed " Typical Paths of Tropical Storms " (at the end of this article) illustrates the terms " dangerous semicircle " and " navigable semicircle." The former lies on the side of the path towards the usual direction of recurvature, i.e., the right-hand semicircle in the northern and the left-hand semicircle in the southern hemisphere. It is so called because a sailing or low-powered vessel caught in it may be blown towards the path along which the storm will pass, or the storm may recurve and the centre pass over her. The navigable semicircle is that which lies on the other side of the path. A ship situated within this semicircle will tend to be blown away from the storm centre, and the recurvature of the storm will increase her distance from the centre.

Practical rules for avoiding tropical storms.—In whatever situation a ship may find herself, the matter of vital importance is to avoid passing within 50 miles or so of the centre of the storm; it is preferable to keep outside a radius of 200 miles or more, because at this distance the wind does not often exceed force 7 (and is generally not more than force 6), and freedom of manœuvre is maintained. If a ship has at least 20 knots at her disposal, and shapes a course that will take her most rapidly away from the storm before the wind has increased above the point at which her movement becomes restricted, it is seldom that she will come to any harm.

Sometimes a tropical storm moves so slowly that a vessel, if ahead of it, can easily outpace it or, if astern of it, can overtake it. Since, however, she is unlikely to feel seriously the effects of a storm so long as the barometer does not fall more than 5 mb. (corrected for diurnal variation) below the normal, it is recommended that frequent readings should be made if the presence of a storm in the vicinity is suspected or known, and that the vessel should continue on her course until the barometer has fallen 5 mb., or the wind has increased to force 6 when the barometer has fallen at least 3 mb. If and when either of these events occurs, she should act as recommended in the following paragraphs, until the barometer has risen above the limit just given, and the wind has decreased below force 6. Should it be certain, however, that the vessel is behind the storm, or in the navigable semicircle, it will evidently be sufficient to alter course away from the centre.

In the northern hemisphere.—(*a*) If the wind is veering, the ship must be in the dangerous semicircle. A power-driven vessel should proceed with all available speed with the wind 1 to 4 points (depending upon her speed) on the starboard bow, and should subsequently haul round to starboard as the wind veers, thereby tracing a course relative to the storm as shown by the pecked line in the diagram. If a power vessel has insufficient room to make much headway when in the dangerous semicircle she should heave to in the most comfortable position relative to the wind, preferably with the wind on her starboard bow so that she is heading away from the centre of the storm.

(*b*) If the wind remains steady in direction, or if it backs, so that the ship seems to be nearly in the path (it is sometimes difficult to determine satisfactorily if indeed the ship is nearly in the path, particularly if in the dangerous semicircle, because the wind does not always behave according to rule) or in the navigable semicircle respectively, a power vessel should bring the wind well on the starboard quarter and proceed with all available speed, subsequently altering course to port as the wind backs, thus tracing a course relative to the storm as shown by the pecked line in the diagram.

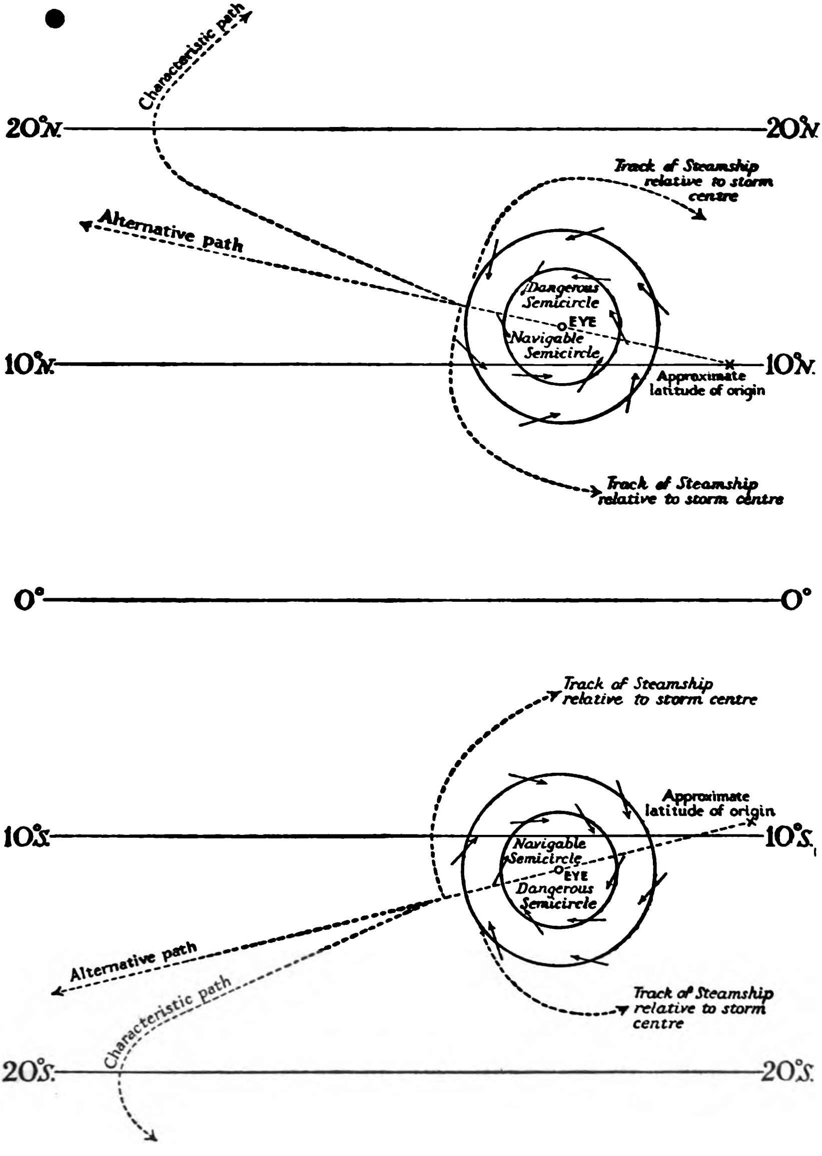
In the southern hemisphere.—(*a*) If the wind is backing, the ship must be in the dangerous semicircle. A power-driven vessel should proceed with all available speed with the wind 1 to 4 points (depending upon her speed) on the port bow, and should subsequently haul round to port as the wind backs, thereby tracing a course relative to the storm, as shown by the pecked line in the diagram. If a power vessel has insufficient room to make such headway she should heave-to in the most comfortable position relative to the wind, preferably with the wind on her port bow so that she is heading away from the centre of the storm.

(*b*) If the wind remains steady in direction, or if it veers, so that the ship seems to be nearly in the path (it is sometimes difficult to determine satisfactorily if indeed the ship is nearly in the path, particularly if in the dangerous semicircle, because the wind does not always behave according to rule) or in the navigable semicircle respectively, a power vessel should bring the wind well on the port quarter and proceed with all available speed, subsequently altering course to starboard as the wind veers, thus tracing a course relative to the storm as shown by the pecked line in the diagram.

If there is insufficient room to run when in the navigable semicircle, and it is not practicable to seek a safe and effective shelter before the storm begins to be felt, a vessel should heave-to in the most comfortable position relative to the wind and sea, bearing in mind the proximity of land.

If a ship finds that she is in the direct path of the storm and has no room to run into the navigable semicircle as directed above, it should be considered, bearing in mind possible recurvature, whether she should endeavour to make her way into the " dangerous " semicircle (where

TYPICAL PATHS OF TROPICAL STORMS


Characteristic path
20°N.
20°N.
Track of Steamship relative to storm centre
Alternative path
Dangerous Semicircle
EYE
Navigable Semicircle
10°N.
10°N.
Approximate latitude of origin
Track of Steamship relative to storm centre
0°
0°
Track of Steamship relative to storm centre
Approximate latitude of origin
10°S.
10°S.
Navigable Semicircle
EYE
Dangerous Semicircle
Alternative path
Characteristic path
Track of Steamship relative to storm centre
20°S.
20°S.

Note.—In this diagram the isobars are shown as concentric circles about the eye; in practice this is usually the case within 150 miles or so of the centre. Outside this distance the isobaric form often loses its symmetry and strong winds often extend farther on the polar side than on the equatorial.

she may at least be better off than remaining in the direct path of the storm) and continue to steam to windward as fast as she can so as to get as far as possible from the centre.

If in harbour, or at anchor, a seaman should be just as careful as at sea in watching the shifting of the wind and estimating the movement of the storm relative to himself, so that he may consider shifting his berth with advantage or otherwise act according to circumstances. It is usually preferable, however, to put to sea if this can be done in sufficient time to avoid the worst of the storm. Riding out a tropical storm, the centre of which passes within 50 miles or so, in a harbour or anchorage, even if some shelter is offered, is an extremely unpleasant and hazardous experience, especially if there are other ships in company. Even if berthed alongside, or with special moorings and long bridles in use, a ship cannot feel entirely secure.

Discretion must, of course, be used. In the case of a low-powered or small vessel with, for example, insufficient warning to enable her to gain sufficient distance from the storm by putting out to sea, it will be preferable to remain in a reasonably sheltered harbour. If at sea and warning of an approaching storm is given and there is considered to be insufficient time or sea room to avoid the dangerous part of the storm area, it may be advisable for vessels of this type to seek shelter. In the China Sea, for example, there are so-called typhoon harbours which are listed in the Admiralty Pilot. In all cases, however, the mariner must use seamanship and initiative.

(3) **Local modification of the weather near the coast.**—The information given in Chapter I on climate and weather in the area covered by the Pilot refers necessarily to the coastal and sea regions generally but cannot attempt to deal with the local effects on the wind and weather of each separate headland, bay, or creek. The following notes, however, should prove helpful in showing how the weather in the general vicinity is likely to be modified by the topography or shape of the land close to the actual place in which the mariner is concerned.

(i) If the coastline is steep-to, onshore winds that approach it at an angle are usually deflected nearly along the shore and increased somewhat in speed. And when the wind approaches a strait whose direction is somewhat similar to that of the wind, the wind tends to blow along the strait and increases in speed as the strait narrows.

When a strong wind blows directly towards a very steep coast, there is usually a narrow belt of contrary gusty winds close to the coast.

(ii) Similarly when the wind blows onshore towards the entrance to a wide estuary, especially one with hills on both sides, it generally tends to blow up the estuary. This effect is most marked in the afternoon but there is often no such tendency during the night and early morning.

(iii) An offshore wind is often squally on the lee side of hilly coasts, especially when the air is much colder than the sea, as for example when it blows off snow-covered land and when the wind over the open sea is force 5 or more.

(iv) Near headlands or islands with steep cliffs there may be large changes in direction (up to about 90°) and speed of the wind in addition to those mentioned above.

(v) During quiet and warm weather with clear or fairly clear skies, a sea breeze is of common occurrence during the warmer part of the day; it is especially frequent in the tropics and subtropics. It blows onshore from, on the average, 4 to 8 hours after sunrise until shortly before sunset, reaching its maximum development during the afternoon (1300 to 1600); if there is an appreciable regional or general wind, then this will be modified by the onshore sea breeze. Under particularly favourable circumstances such as high dry temperatures, relatively cool sea, and hilly background to coast, the sea breeze may blow as much as force 4 (occasionally 5) and extend 20 miles or more to seaward from the shore. At night under similar circumstances a lighter breeze blows from the land to the sea; it seldom extends more than 5 miles from the shore nor does it become appreciable much before 2200 local time; under favourable conditions, as in the tropics, it usually lasts until an hour or so after sunrise.

(vi) When sea fog that is caused by the passage of warm air over a colder sea surface is general over the open sea, visibility is better close to leeward of a hilly island or promontory than to windward. This effect is most marked in late spring and summer, during the early afternoon when the land is at its warmest, and then applies to low-lying land as well.

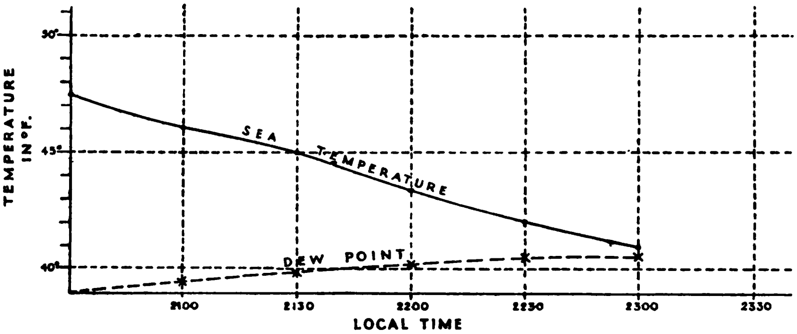
(vii) Radiation fog which forms over land on quiet nights with clear skies, mainly in autumn and winter, and sometimes spreads a few miles out to sea, is least thick during the afternoon and is often worst during the first hour or two after sunrise.

(4) **Forecasting sea fog.**—The most frequent type of fog in the open sea is that caused by relatively warm air flowing over a colder sea. Warning of this type of fog may be obtained by frequent observations of air and sea surface temperatures; if the sea temperature falls below the dewpoint of the air, fog is almost a certainty. The following procedure is recommended whenever the temperature of the air is higher than, or about equal to, that of the sea, especially at night when approaching fog cannot be seen until shortly before entering it.

Sea and air (both dry and wet bulb) temperatures should be observed at intervals of about 5 miles and the sea temperature plotted against dewpoint. The dewpoint is obtainable from tables published in various text-books, but at temperatures up to about 60° F. a close enough approximation may be obtained by assuming it to be the same amount below the wet-bulb temperature as the latter is below the dry-bulb temperature; for example, if the dry bulb reads 50° F. and the wet bulb 48°, the dewpoint is about 46°. If the curves of sea temperature and dewpoint converge, fog may be expected by the time at which they coincide.

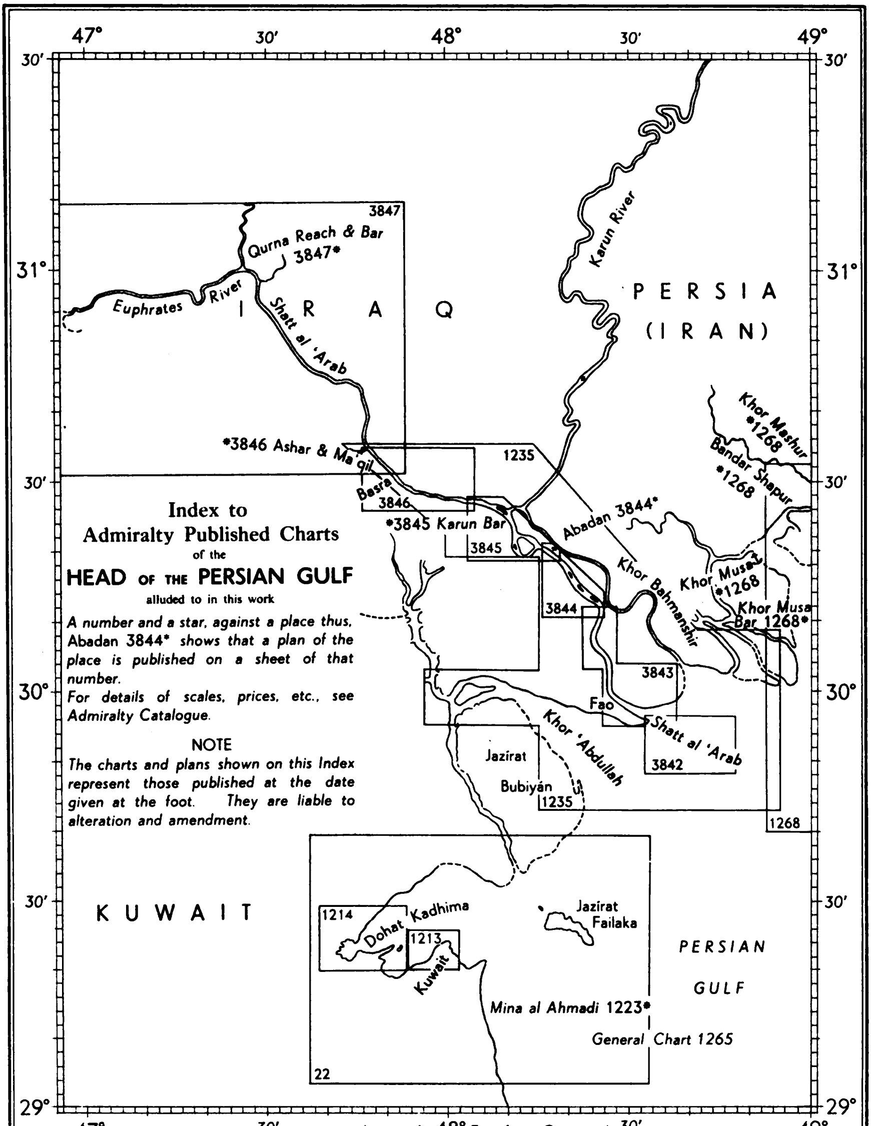
The figure on the next page represents conditions that might be found by a low-powered ship in about long. 40° W. proceeding westward on the appropriate lane route for Halifax, Nova Scotia. At 2200 it would become evident that there is a probability of running into fog in about an hour's time, assuming that the sea temperature continues to fall at about the same rate that it has done during the last 1½ hours.

From the appropriate chart of average sea surface temperatures it can be seen where a rapid fall of temperature may be expected, so that if the dewpoint is within 5° or so of the sea temperature when approaching the colder water zone, this will also give a fairly reliable warning of fog.



If it is desirable and practicable to escape from fog, a ship should steer for warmer water which will again be evident from the charted isotherms.

Fog, or very poor visibility, at sea may also occur in snow or heavy rain, or in association with the passage of a warm front or occlusion, or, when within 20 miles or so of land, it may occur as a result of radiation fog extending from the land; in high latitudes in winter, sea smoke may be met near land, when very cold offshore winds are blowing, or near extensive ice. The method described above will not give warning of these fogs, of which frontal fogs, though common in middle latitudes, are neither so extensive nor so persistent in any one locality, and the other fogs mentioned are rarely encountered far from land (or extensive ice).



Index to Admiralty Published Charts
of the
HEAD OF THE PERSIAN GULF
alluded to in this work

A number and a star, against a place thus, Abadan 3844 shows that a plan of the place is published on a sheet of that number.*
For details of scales, prices, etc., see Admiralty Catalogue.

NOTE

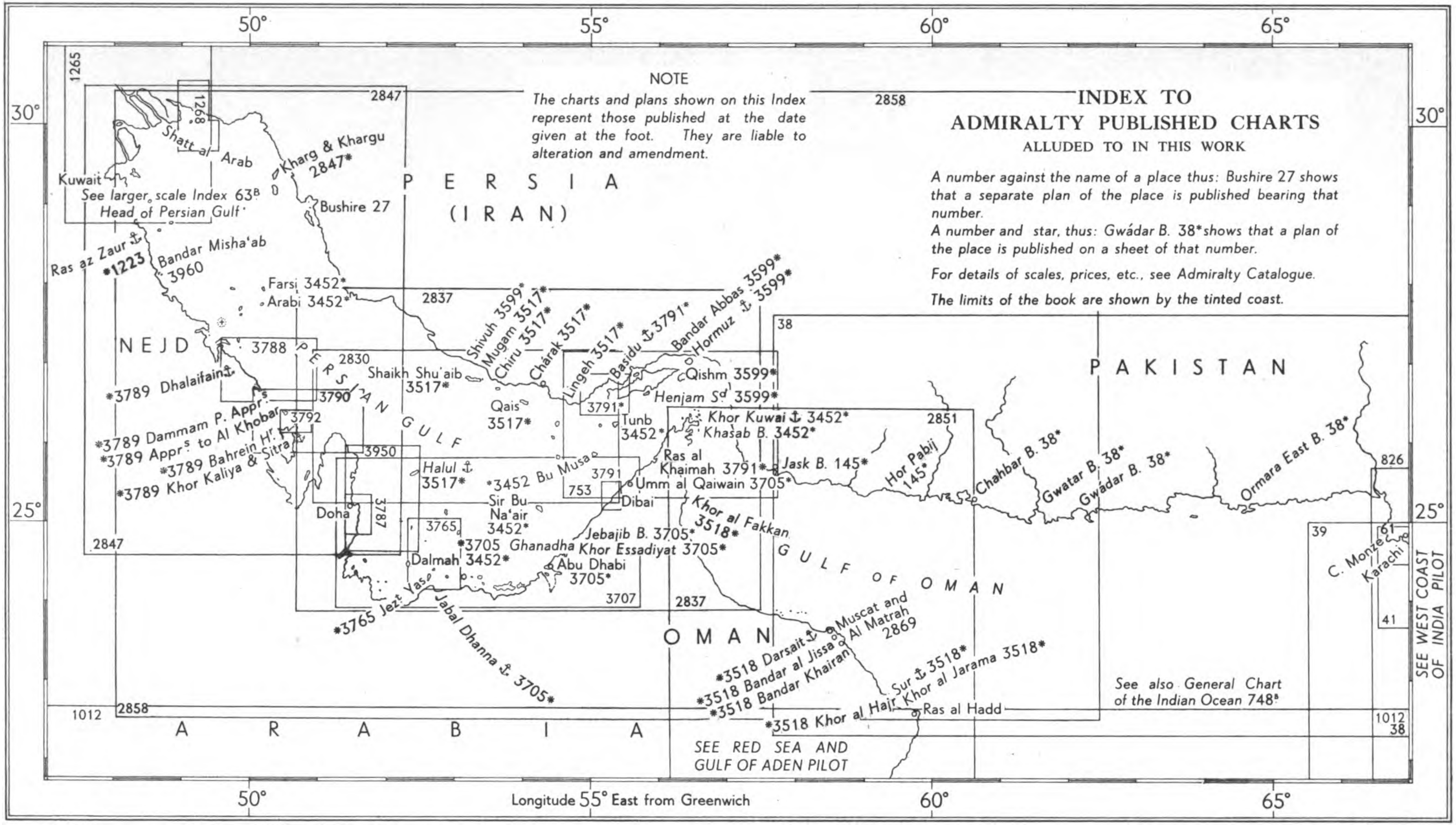
The charts and plans shown on this Index represent those published at the date given at the foot. They are liable to alteration and amendment.

Persian Gulf Pilot

February 1955

S.D.63^{B}

C.B.H. 26251



INDEX TO ADMIRALTY PUBLISHED CHARTS

ALLUDED TO IN THIS WORK

A number against the name of a place thus: Bushire 27 shows that a separate plan of the place is published bearing that number.

A number and star, thus: Gwádar B. 38* shows that a plan of the place is published on a sheet of that number.

For details of scales, prices, etc., see Admiralty Catalogue.

The limits of the book are shown by the tinted coast.

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IMPORTANT.

Details of Lights, Fog Signals, and Time Signals (visual) are not included in this volume ; for this information the Admiralty List of Lights, Vol. 6, should be consulted.

Information regarding Vertical Movement of the Water is not included ; for this the Admiralty Tide Tables should be consulted.

Details of Radio information (weather bulletins, storm and navigational warnings, time signals, fog signals, and D.F. stations) are not included ; for this information the Admiralty List of Radio Signals should be consulted.

PERSIAN GULF PILOT

CHAPTER I

PERSIAN GULF.— ARABIA.— ‘IRAQ.— PERSIA.— BALUCHISTAN.— CURRENTS. —SEA. —SWELL. —TIDAL STREAMS. —BUOYAGE.—LIFE-SAVING.—AIR-LIGHTS.—PORT REGULATIONS.—SUBMARINE CABLES.—PILOTAGE.—DERATISATION.—NATIVE CRAFT.—FUEL.—REPAIRS.—STANDARD AND SUMMER TIMES.—CONSULS.—COMMUNICATIONS.—RADIO STATIONS.—PASSAGES.—CLIMATE AND WEATHER.—CLIMATIC TABLES.

PERSIAN GULF.—General remarks.—The Persian gulf is comparatively shallow. It is approached by way of the Gulf of ‘Omān, which latter may be considered as an arm of the Arabian sea, extending in a north-westerly direction from a line joining Ras al Hadd, at the eastern extremity of Arabia, and Gwātar bay, on the boundary between Persia and Baluchistān, about 185 miles north-eastward; thence through the Strait of Hormuz.

In addition to a description of the shores of the Gulf of ‘Omān and the Persian Gulf, this volume describes the coast of Baluchistān.

Physical features.—The south-western shore of the Gulf of ‘Omān is, in general, steep-to with but few off-lying shoals, though there are some islets near Muscat, situated about 93 miles north-westward of Ras al Hadd, and others about 30 miles farther north-westward. With the exception of Al Bātina, a wide fertile plain extending, from the coast to the foot of the mountains, for about 150 miles north-westward of Muscat, the interior of the country is arid, desert, and mountainous.

The coast of Baluchistān and the northern shore of the Gulf of ‘Omān extend, for about 520 miles, in a westerly direction, from the River Hab to Ras al Kūh at the entrance of the Persian Gulf, whence the shore extends northward. The whole of this stretch is, in general, clear of off-lying shoals, though there are some in the vicinity of Astola island, (*see* page 66), and Baklang rock (page 77) is an isolated danger. Owing to the small rainfall, the salt nature of the soil, and the physical conformation of the country, it is almost entirely desert, presenting a succession of arid clay plains impregnated with saline matter, and intersected by watercourses. From these plains rise precipitous table-hills, with fantastic peaks and pinnacles, varying in elevation from 2,050 feet (624^{m}8), at Ras Malān, (page 63) to hillocks only 20 or 30 feet (6^{m}1 or 9^{m}1) high. Farther inland, other ranges of mountains, of varying height, extend parallel with the coast, and all appear to be devoid of vegetation.

The coast is barren and indented, but its most characteristic feature is the repeated occurrence of promontories and peninsulas of white clay cliffs capped with coarse limestone or shelly breccia, all the summits of which are more or less table-topped in form. The intervening stretches of coast are low, in places rising to high white sand hills, or to sand dunes, on which are small bushes and tufts of grass; in many places the coast is merely a very low strip of sand, backed by extensive salt-water swamps; off such parts, caution is necessary, for the distance offshore is very liable to be over-estimated.

With the exception of the Hab and Purali, there are no perennial rivers, and, near the sea, the streams, which are frequently dry or nearly so, except after rain, become salt-water creeks, only navigable by small boats. There is no vegetation except, here and there, a clump of date palms near a village or settlement, in the vicinity of which there may be a small amount of cultivation.

The Persian or north-eastern shore of the Persian gulf is mountainous, and in most places steep-to; it presents a series of rugged and precipitous mountain ranges running, in general, nearly parallel with the coast. These mountain ranges increase in height as they recede inland and, being visible at great distances, are good marks; some, even, are snow-capped for a great part of the year. Wide valleys separate the mountains, and there are belts of low land of varying width, between them and the sea, which are called, by the Persians, the Garmsīr or winter pastures; the latter being at the southern foot of the mountains, and watered by no river, they are very hot in summer.

The Arabian coast, or southern and south-western shore of the Persian gulf, is, with the exception of the north-western side of the 'Omān peninsula, exceedingly low; from it, for nearly its whole length, reefs and shoals extend as much as from 30 to 50 miles in places. The Arabian coast is, for the most part, a desert of white sand, and extensive tracts are quite uninhabited. Near the villages, or where there are inhabitants, there are, generally, more or less extensive date groves.

There are numerous islands in the Persian gulf, the two largest being Qishm, off the Persian coast, on the northern side of the Strait of Hormuz, and Bahrein, on the western side of Al Qatar, a large projection in the south-western corner of the gulf. Some are merely sand islets, while many are, at least partly, of volcanic origin.

The head of the gulf is the low alluvial land of the deltas of the Tigris, Euphrates, Kārūn and other rivers. The north-western end of the gulf is probably silting up, owing to the large amount of alluvium deposited by the great rivers debouching there. The water in the upper part of the gulf is much more salt than that of the ocean.

Caution.—With respect to the descriptions given in this work concerning trees, and the shape and colour of buildings, etc., caution should be exercised, for many new buildings may have been erected, and old ones destroyed, so that such marks, which may at one time have been conspicuous on account of their isolation, shape, or colour, may no longer exist, or may now be difficult to identify. The mariner may find, moreover, that some towns and villages mentioned herein have disappeared, and others not mentioned have sprung up. New places frequently originate through the secession of families, who, being dissatisfied with the chief of their own tribe, emigrate and build a new settlement of their own.

Depths.—The depths in the Gulf of 'Omān and in the Persian gulf are generally great off the high coasts, but less off the low coasts.

Within the Persian gulf, the depth rarely exceeds 40 or 50 fathoms ($73^{m}2$ or $91^{m}4$), and it decreases to 30 and 20 fathoms ($54^{m}9$ and

$36^{\text{m}}6$) towards the head ; on the Pearl banks, which occupy about one-third of the area of the gulf, the depth is less than 20 fathoms ($36^{\text{m}}6$). In depths of less than 20 fathoms ($36^{\text{m}}6$), especially off the Arabian coast, the soundings are irregular, with shallow banks and shoals.

Off the Persian coast, and in the deep part of the gulf, the bottom is generally mud ; on the Pearl banks it is hard sand, coral, and rocks ; and in many places off the Arabian coast, especially northward of Bahrein, it is white clay.

Off the Makrān coast, which comprises the stretch of coast from the River Hab to the Perso-Kalāt frontier in Gwātar bay, the depths are fairly regular, the bottom being rock, sand, and mud near the land, and mud or clay in depths of over 12 fathoms ($21^{\text{m}}9$) ; the increase in depth is mostly gradual up to 20 fathoms ($36^{\text{m}}6$), beyond which it increases rapidly.

Ports and anchorages.—The principal port in the area covered by this work is Basra, in ʻIraq, situated about 72 miles above the entrance of New channel. Others of importance are Muscat, the only port of call for steam vessels in ʻOmān ; Dibai, Bahrein, Ras at Tannūra, Bandar Misha ʻab and Kuwait on the Arabian coast ; and Khorramshahr, Bushire, and Bandar ʻAbbās, in Persia. Of lesser importance are Pasnī and Gwādar in Makrān ; Chānbahār in Persian Makrān ; Lingeh in Persia ; and Bandar Shāpūr, the Persian port in Khōr Mūsa, at the head of the gulf.

Though not regular harbours, there are many roadsteads and anchorages both in the mainland and at the islands, where shelter may be obtained.

For list of principal ports and anchorages with particulars of depths, etc., *see* page 286.

Towns.—The small towns on the shores of the Persian gulf are all very similar ; a square fort of rough stones with loopholed towers at the angles, or several detached round towers ; the Shaikh's house, and perhaps one or two others, of stone, the remainder of mats ; a date grove in the immediate vicinity, and a detached tower or two near the wells, are the invariable components. They are, as a rule, situated near a small creek or backwater, where there is a smooth place for hauling up boats. The large towns are sometimes walled round, and have a larger proportion of stone buildings, but there are no pretensions to architecture, and the houses are seldom of more than two stories.

The *birkeh* is a characteristic of many of the Persian towns and villages on the shores of the gulf ; it is a water reservoir, either oblong and arched over, or circular and domed ; being white, it is often conspicuous from seaward, especially the domed variety.

The *bād-gīr* or wind-tower is a feature in many of the villages on the shores of the Persian gulf. It is a square or round, masonry or brick tower, rising 10 or 12 feet ($3^{\text{m}}0$ or $3^{\text{m}}7$) above the roof of the house of which it is the ventilator. The interior is divided vertically into four segments, the partitions being extended several feet above the walls of the actual tower to catch any breath of wind from whichever direction it may blow. The base of the tower opens into the room below, and the seat of honour in the hot season is near this ventilating shaft.

Population.—Languages.—The inhabitants of ʻOmān are, for the most part, poor, and a large number of them are nomadic ; though mainly consisting of Arabs, there is a considerable admixture of foreigners, such as natives of India and Pakistan, Persians, East Africans, and Nubians, whilst people of mixed races are usually found in the larger towns. The estimated population is about 550,000 ; and that of Muscat and Al Matrah together about 12,000 in 1952.

The language of 'Omān is Arabic ; but many persons in Muscat and Al Matrah speak Persian, Baluchi, and Hindustani.

The population of the Arabian coast of the Persian gulf is exclusively Arab, except in the towns of Dibai, Dōha, Bahrein, and Kuwait, where many Persians reside. In the towns they may be trusted, but it is not safe to land unarmed on the mainland, on account of the Bedouin who may be occasionally met and who, for the sake of plunder, attack even their own townsfolk. The population of Nejd was estimated, in 1953, to be about 4,000,000 ; and that of Hofuf, the largest town, about 30,000. The population of Bahrein was estimated to be about 110,000 in 1953 ; Manāma accounting for about 40,000. The population of the State of Kuwait was estimated in 1953, to be 205,000.

In Makrān and Las Bēla, *see* page 59, the population is everywhere sparse ; in the former many mixed races occur, varying both in physical and moral qualities ; in the latter are Jats, called Lāsis. The people are poor, simple, and primitive ; hospitable to strangers and faithful in the performance of duty. They are friendly with and accustomed to Europeans. The language is a dialect of Persian, and approximates the more nearly to that tongue as the western frontier is approached ; it is hardly a written language, Persian being generally used in correspondence. The small seaport towns are chiefly inhabited by Arabs. In the larger places an admixture of Persians is found, also Banyans from Sind or Kutch, by whom the very limited trade of the country is chiefly carried on. The rural population is almost exclusively Persian, but Persians do not take to the sea, and all craft sailing from Persian ports are manned by Arabs. The people live in mat huts, which are easily moved, so that a village is often merely temporary. In more permanent settlements, there is a tower or fort in addition to the huts, and it is only at the villages of Sonmiyani, Ormāra, and Gwādar that masonry or mud houses are found. In 1951, the population of the State of Kalāt, including Kharan was 337,518 ; and that of Las Bēla, 75,769.

According to the latest estimates, the population of Persia was estimated, in 1951, to be 19,139,563 ; that of Khorramshahr and Abādān being 201,000. Persian is the language of the country, but Turkish and Turkish dialects are spoken in the north-western parts.

Outside the towns, the population of 'Iraq is almost entirely tribal. That is, the population is divided into collections of kindred families which form communities under the leadership of their own chiefs or Shaikhs. In the plain there are Bedouin tribes who are nomadic pastors of camels, sheep, and horses. There are also cultivator tribes near the rivers, and in addition semi-settled semi-nomadic tribes and marsh tribes. Except in certain areas in the north, where Kurdish and Turkish are the vernacular, the language of 'Iraq is Arabic. In 1947, the total population was 4,816,185.

Supplies.—Products.—Trade.—Basra is the only port, in the area covered by this work, at which all necessaries can be obtained.

The great heat of summer is very favourable to the cultivation of dates, which fruit forms the staple article of food of the inhabitants of most of the coasts described in this work. Those grown near the Shatt al 'Arab, said to be the finest in the world, are exported, as well as quantities from Al Bātina.

The most important products of the gulf are petroleum and pearls. The former is found at the head of the gulf and is exported from Abādān and Kuwait. Oil is also exported from Al Qatar and Bahrein. Bahrein is the centre of the pearl fisheries.

The principal exports of 'Omān are dates, pomegranates, dried limes, and dried fish. The imports are rice, coffee, and cotton piece goods, etc.

The principal exports from Nejd are petroleum and an insignificant quantity of dates, hides, and ghí (clarified butter). The imports are piece goods, cereals, motor vehicles, building materials, tea, sugar, coffee, and rice. The products consist of dates, wheat, barley, fruit, hides, wool, ghí and abas (Arab cloaks), in addition camels, horses, donkeys, and sheep are reared.

The chief imports of Bahrein are sugar, provisions, rice, clothing, piece goods, household goods, machinery, motor vehicles, building materials, tea and ghí ; the exports are petroleum, pearls, rice, sugar, provisions, cars and lorries.

The importation of arms and ammunition into Bahrein and Kuwait, except with the consent of the British Government, is prohibited by treaty ; and that of alcoholic liquors and drugs is prohibited by local regulation, though permission is granted to Europeans to import such articles for their personal use.

The principal products of Persia are mineral oil, carpets, gum, textiles and raw cotton, wool, fresh and dried fruit, furs and skins, rice and opium. The principal exports are mineral oil products, opium, gum, fruits, hides and skins, cotton and rice. The chief imports are cotton and woollen fabrics, tea, sugar, motor vehicles, railway materials, chemicals, electrical goods, hardware, chinaware and cement.

The principal exports of 'Iraq are wheat, barley, dates, wool, mineral oil products, and cotton ; the chief imports are textiles, iron and steel, machinery, automobiles, sugar, tea, clothing and piece goods, chemicals soap, paper and timber.

Currencies.—Weights and measures.—There is no national coinage in 'Omān ; the current money there and at Bahrein and Kuwait is the Indian rupee and the Austrian Théresa dollar ; the rate of exchange varies.

The currency of Nejd is based on the silver *riyal,* weighing 24.055 grammes, 0.830 fine ; the riyal is divided into eleven *qarsh miri,* and the qarsh miri into two *qarsh darij.*

On the Makrān coast, the Indian rupee and copper pice, and the Théresa dollar are all used. The Indian coinage is probably the best known.

In Persia, the monetary unit is the rial = 100 dinars. Exchange has been controlled since March 1936.

In 'Iraq, the monetary unit is the 'Iraqi dinar = 5 riyals = 20 dirhams = 1,000 fils. Silver coins are 50 and 20 fils ; other coins are 10, 4 (nickel), 2 and one (bronze) fils. There are notes for ¼, ½, one dinar, 5, 10, and 100 dinars.

Weights and measures in 'Omān vary somewhat from place to place. The weights in use at Muscat and Al Matrah for the Sultan's Customs are based on the *maund* or *mann,* equivalent to about 8 lb. 14½ oz. ; but the bazaar *mann* equals only about 8 lb. 8 oz. The unit of length is the *dhra* ; this is the cubit or distance from a man's elbow to the tip of his middle finger.

The Arabs have no definite measure of distance, which by them is most vaguely estimated.

On the Makrān coast, both the Indian *maund* and the English weights are understood at the telegraph stations.

In Persia, the metric system of weights and measures is in force. The kilogram, equivalent to one-third of the Tabriz batman, is the unit for weights, and the metre for measures.

In 'Iraq, the metric system is being gradually introduced. The principal local weights are :—

1 hogga = 2·8 lbs. (approx.)
1 man = 56 lbs. (approx.)
1 wazna = 224 lbs. (approx.)
1 tughar = 4,480 lbs. (approx.)

In addition to the metre and English yard, the dhra of 29·38 inches, and the Aleppo dhra of 27 inches are used. The principal measure of area is the mishara = 0·62 acres.

Pearl fishery.—The pearl fishery gives employment to the greater part of the maritime population of the Persian gulf. The boats vary in size from 10 to 50 tons, and their crews from 8 to 100 men. The chief pearl market for the Persian gulf is at Manāma, at the northern end of Bahrein island, and there are others at Dibai and Kuwait. The pearl trade off the Persian coast is now negligible.

There are three seasons for the pearl fishery, the first being the *Khanchia*, the second the *Ghaus*, and the third the *Radda*. The first lasts for from 25 to 30 days, roughly from April 1st to 30th ; the second extends over May, June, July, August, and the first ten days of September ; and the last continues for a further 25 days or more, depending on the weather, or until about October 5th or 10th. Between the middle of May and the end of October, more than 500 boats are engaged in the pearl fishery.

The pearl banks appear from time immemorial to have been open without distinction to the Arabs of the entire littoral, and it would be futile here to attempt to specify any definite tribal limits, but the external boundaries are well known, and all intrusion is resented. Nearly all the towns on the Arabian side, and many on the Persian, send boats to the fishery.

The fishery is pursued on any banks where the bottom is hard and level without rugged rocks ; the average depth is 8 fathoms (14^{m}6), and the extreme depth about 14 fathoms (25^{m}6). The general Arabian name for such a bank is *hair or heir*. Of these banks, the names and positions of no less than 184 are known between Dibai and Ras at Tannūra, or between the parallels of 24° 10′ N. and 27° N., and the meridians of 50° E. and 55° E., whilst there are also 217 banks known to the fisherman, and 24 different descriptions of pearls. The longest time a diver can remain under water does not exceed one minute and a half, and only a few exceed one minute.

Health.—In spite of the general dryness of the coastal regions, malaria is endemic throughout the year. The worst cases occur in the late summer and autumn and the disease is less prevalent in the period from January to April. Yellow fever is unknown.

Cholera and plague sometimes occur. Smallpox is more frequent ; a small encampment at a short distance from an Arab town is often a kind of lazaretto for smallpox, and should be avoided. Conjunctivitis and trachoma are extremely prevalent among the natives.

The climate of the Persian gulf is very trying, though it is not altogether unhealthy.

In the hot season seamen may suffer from aggravated prickly heat, boils, etc., but if they are kept out of the sun, and ventilation is attended to, there will probably be but little serious sickness. Awnings must be spread, and the men should sleep on deck, where the dew does not appear to have an injurious effect. Absolute necessity alone can justify the exposure of the men to the sun, and tropical helmets should be insisted on.

Kuwait is the most healthy town in the gulf, and malaria is practically unknown there.

Although the figures of relative humidity given in the climatic tables on pages 28-36 may not appear unduly high, they must be considered in relation to the comparatively high temperature of the air. The temperature shown by a wet bulb thermometer gives a better measure of atmospheric conditions as affecting the human body. Thus, it is generally supposed that climates with an average wet bulb temperature of over 70° for the year are unsuitable for permanent settlement by white races ; when the wet bulb stands at 85°, heat-stroke is likely to occur, and at from 88° to 90° in still air the ordinary cooling function of the body can no longer operate, even in the case of a man stripped to the waist.

ARABIA.—Sultanate of Muscat and 'Omān.—Those portions, dealt with in this work, of the coasts of this Muhammadan state may be considered in three divisions, namely : 'Omān, Al Bātina, and Ruūs al Jibāl.

The coast of 'Omān extends from south-westward of Ras al Hadd to just beyond Ras al Hamar, nearly 100 miles north-westward, and includes the town of Muscat ; that of Al Bātina is contiguous to that of 'Omān, and extends from Hail al 'Amair to Khatmat Milāha, a distance of about 140 miles ; while Ruūs al Jibāl is a detached province, at the extremity of the promontory forming the southern side of the entrance of the Persian gulf, extending from the village of Al Karsha, in Dōhat Dibba, to Tibba, on the western side of the promontory, and including the islands lying close off the promontory.

The Sultan is an independent potentate who has commercial treaties with France and the United States of America as well as with Great Britain. Since the end of the eighteenth century, British influence has been, in general, predominant in 'Omān, and friendly relations have always been maintained between the Sultan and the Government of Great Britain. The Government of Great Britain is represented, in Muscat, by a Political Agent.

In addition to his possessions in Arabia, the town and port of Gwādar in Makrān (*see* page 71), belong to the Sultan of Muscat and 'Omān.

The Trucial States.—The coasts of the districts embraced under this title extend from Ras ash Sha'm, on the western side of the promontory, terminating in Ruūs al Jibāl, to Khor al 'Odaid, in the south-western corner of the Persian gulf. Ash Shumilīya, in the Gulf of 'Omān, between Al Bātina and Ruūs al Jibel, is also a portion of Trucial 'Omān.

The Trucial States comprise Ras al Khaima, Umm al Qaiwain, 'Ajmān, Shājah, Dibai, Abu Dhabi, and Fujaira ; they are independently administered tribal principalities, governed by independent Arab Shaikhs.

The Trucial Shaikhs all have treaty engagements with Great Britain, and H.M. Government is represented, at Shārjah, by an agent of the Political Resident in the Persian gulf.

Al Qatar. This Shaikhdom includes the whole of the peninsula of Al Qatar, from Khor al 'Odaid to the boundary of Nejd. The relations of the Shaikh of Al Qatar with the British Government are similar to those of the Trucial Shaikhs. The settled population is about 18,000.

The State of Bahrein.—This island principality, situated at the entrance of Dōhat as Salwa, is an independent Arab State under the protection of H.M. Government ; but it is not a British Protectorate.

Kingdom of Nejd.—In the Persian gulf, the coastline of this kingdom extends from its boundary with Al Qatar for about 240 miles north-westward to the southern boundary of the neutral zone between Nejd and Kuwait, which is situated about 4 miles north-westward of Ras al Misha'ab, and may be said to embrace the district known as the Hasa. The kingdom is one unit of H.M. Ibn Sa'ud's dominions, the full title of which is the kingdom of Saudi Arabia.

The administration of Nejd is simple, and of a patriarchal character, without ministers of State, the King being usually represented by a Viceroy.

The State of Kuwait.—The coast of this independent Arab State, under British protection, extends from the northern boundary of the neutral zone between Nejd and Kuwait, situated about 10 miles north-westward of Ras az Zaur to the junction of Khōr as Sabīya and Khōr Shetana, about 70 miles northward. The islands of Umm al Marādim, Qārū, Al Kubr, Kurein, Failaka, 'Auha, Mashjang, Būbiyān, and Warba are dependencies of the Sultan of Kuwait.

The Sultan's rule is personal and autocratic ; in Kuwait town his authority is strictly enforced, but in the country districts, where control is difficult, it is necessarily more tolerant.

'IRAQ.—The maritime coast of the Kingdom of 'Iraq extends from Khōr Shetana to the mouth of the Shatt al 'Arab. Within the river, the western bank only is in 'Iraqi territory, as far as the mouth of Khaiyin canal, about 3¼ miles above the entrance to Hafar channel, but above that point both banks belong to the kingdom of 'Iraq.

The legislative power is vested in Parliament, with the King ; Parliament consists of an appointed Senate and an elected Chamber of Deputies.

'Iraq is divided into fourteen main administrative divisions or Liwas, each administered by a Mutasarrif, who is responsible to the Minister of the Interior, but is also the agent and representative of the other Ministries. Each Liwa is divided into two or more Quadhas, administered by a Qain Maqqam ; and each Quadha is sub-divided into two or more Nahiyahs, administered by a Mudir.

PERSIA.—The riverain and maritime coasts on the southern side of Persia, which is also known as Iran, extend from Khaiyin canal, in the Shatt al 'Arab, to the eastern boundary of Persian Makrān, in Gwātar bay, and include the whole of the north-eastern shores of the Persian gulf and Gulf of 'Omān.

This kingdom, the head of which is the Shah, possesses a Constitution. There is a National Assembly or Majlis, and a Senate. The government of the country is in the hands of a Cabinet.

The country is divided into 10 Ustāns or Provinces, each governed by an Ustāndār. Each Ustān is subdivided into Shahristāns, each governed by a Farmāndār. Each Shahristān is in turn sub-divided into Bakhshes, each under a Bakhshdār ; and the Bakhshes into

Dehistāns, each under a Dehdār ; this final sub-division consists of a village or group of villages. The number of Shahristans was 76, in 1954.

BALUCHISTĀN.—Makrān.—Baluchistān is a part of West Pakistan. Makrān is the south-western division of the State of Kalāt in Baluchistān, and its coast extends from the frontier of Persian Makrān, about 8 miles eastward of Gwātar, to that of Las Bēla, at Khōr Kalmat ; excepting the town and port of Gwādar and an area of about 307 square miles surrounding it, which are held by the Sultan of Muscat and 'Omān.

The State of Kalāt consists of a confederancy of tribal groups, headed by the Khān of Kalāt.

Las Bēla.—This is a State in Baluchistān, and lies eastward of Kalāt ; its seaboard extends from Khōr Kalmat to the River Hab. The state is ruled by a chief with the style of Jam.

CURRENTS.—The number of available current observations is scanty over the whole of the region covered by this volume. Furthermore, the whole of the Persian gulf and the western part of the Gulf of 'Omān lie within soundings so that the water movements reported by ships in these areas are not true currents, but the resultants of currents and tidal streams.

The Persian gulf and Gulf of 'Omān lie outside the region of the alternating monsoon winds of the Arabian sea, which therefore have no direct effect on the currents experienced in these gulfs. Off the Makrān coast, the south-west monsoon is hardly felt and the north-east monsoon does not blow in strength. The present volume therefore does not cover any part of the main monsoonal current circulation of the Arabian sea, which is described in West Coast of India Pilot and also in Red Sea and Gulf of Aden Pilot.

Persian gulf.—No exact information can be given about the currents of this gulf, which appear to be generally variable throughout the year. There is some evidence that the predominant flow of water through the Strait of Hormuz is westerly into the gulf in most months of the year. The only other predominant trend that can be deduced from the available observations is a westerly flow along the northern shore of the gulf between the Strait of Hormuz and Ras al Mutaf, which appears to be most prevalent from June to December.

The rate of the majority of currents does not exceed one knot, but occasional stronger currents may be met, with a probable maximum of about 1½ knots.

Gulf of 'Omān.—The currents in this gulf appear to be variable throughout the year, so that sets in any direction may be experienced at any time. They are influenced by the winds which are variable in all months. There is some evidence that during the period April to August currents set into the gulf, in directions between north and west, more frequently than in the opposite direction. Similarly, there appears to be some predominance of current flowing out of the gulf during the period October to January, particularly south-easterly current setting along its southern shore from the vicinity of Daimānyāt islands to Ras al Hadd. Reliance should not be placed, however, on meeting currents in the directions indicated.

The rate of the majority of currents in the Gulf of 'Omān does not exceed one knot during the year. Stronger currents are occasionally met ; these have a probable maximum of about 1½ knots. This does not take account of the strong tidal streams which occur in the extreme northern part of the gulf, *see* Tidal Streams.

Makrān coast.—The currents off this coast are variable. In most months, particularly during the south-west monsoon period of the Arabian sea, there are more currents in easterly directions than in westerly ones. The majority of the currents observed do not appear to exceed one knot.

Effect of a tropical revolving storm on the current.—In the vicinity of a tropical revolving storm the set and drift of current may be markedly different from that normally to be expected. Comparatively little is known about such currents, particularly near the centre of the storm, since navigators avoid the centre whenever possible and conditions within the storm field generally are unfavourable to the accurate observation of current.

The primary cause of the currents is the strong wind associated with the storm ; the strength of current produced by a given force of wind varies with latitude and is greatest in low latitudes. For the latitudes of tropical storms, say 15° to 25°, a wind of force 10 would produce a current of about one knot. It is believed that the strength of the currents of tropical storms is, on the average, the same as that which wind of similar force, unconnected with a tropical revolving storm, would produce. These currents, at the surface of the water, set at 45° to the right of the wind direction (in the northern hemisphere) and therefore flow obliquely outward from the storm field though not radially from the centre.

Unless due allowance is made for these sets, very serious errors, in reckoning may therefore arise. It is reported that, in one case, a vessel experienced a south-easterly set of more than 50 miles, under conditions when the set normally to be expected was south-westerly. In another case, an unexpected south-south-westerly set of 60 miles was experienced in 18 hours. These are examples of currents of abnormal strength, which are occasionally met in the vicinity of tropical revolving storms, and which cannot be accounted for by the wind strength. The possibility of such an experience should be borne in mind, particularly near, say, within 100 miles of the centre of the storm.

Other currents, not caused directly by the wind, may flow in connection with these storms, but are probably weak and therefore negligible in comparison with the wind current.

The above remarks apply to the open ocean. When a tropical storm approaches or crosses an extended coastline, such as that of Florida, a strong gradient current parallel to the coast will be produced by the piling up of water against the coast ; the sea-level may rise by as much as from 8 to 15 feet on such an occasion.

Whether the storm is in the open ocean or not, there is a rise of sea-level inwards to its centre which compensates for the reduction of atmospheric pressure. The extent of this rise is never great, from one to two feet according to the intensity of the storm ; it produces no current as long as the storm is not changing in intensity. If the storm meets the coast, however, the accumulation of water at its centre will enhance the rise of sea-level at the coast mentioned above and so produce a stronger gradient current along the coast.

SEA.—SWELL.—The swell of the South-west monsoon rolls round Ras el Hadd, and is felt off Muscat, and even near the entrance of the Persian gulf, though there only slightly. Sometimes there is a heavy swell in the entrance of the Persian gulf for several hours, without any wind either preceding or following it ; such a swell is usually, however, the forerunner of a gale.

From June to September, a heavy swell, caused by the South-west monsoon, rolls in on the Makrān coast. The swell comes from west-south-west or south-west at Karachi, from south-south-west at Gwādar, from about south at Chāhbahār, and from south-east at Ras Jāsk. It decreases gradually from Gwādar to Ras Jāsk, at which latter it is a light ground swell. The swell is usually much heavier than that which would be due to the strength of the wind on the coast, but it varies much, and during a break in the monsoon is often light ; sometimes it disappears in early September, at other times it continues heavy during the greater part of that month, though by the end it has always ceased.

On the occurrence of a cyclone or storm in the Arabian sea, a considerable swell rolls up from the south, or a heavy ground swell with surf on the coast may be experienced.

In the Persian gulf, the sea gets up quickly, and is short and hollow. At the entrance, when the tidal stream is strongly opposed by a heavy shamāl, it is particularly troublesome, breaking very heavily ; it is often out of all proportion to the force of the wind, but quickly subsides after a gale. During a heavy shamāl, there is a very high sea off Muscat, and also on the Makrān coast.

TIDAL STREAMS.—The information available on these subjects is meagre. It would appear that the surface drift, due to the winds, is sometimes so great that the tidal streams, when opposed to it, fail to overcome it, and the resultant stream continues in one direction, merely changing its rate.

In the Persian gulf the diurnal inequality in the tidal streams is considerable ; of the two streams setting in a particular direction during 25 hours, one is considerably stronger than the other. This effect is most marked when the moon has a high declination north or south, and is least when the moon is on the Equator. The same effect produces the higher high water and the lower low water each day. In extreme cases it produces diurnal streams which turn only twice in 25 hours. In general, the diurnal inequality is greatest on the Great Pearl bank eastward of Al Qatar peninsula, and diminishes northward and towards the Gulf of 'Omān.

Off the southern part of the south-western side of the Gulf of 'Omān, the tidal streams are almost imperceptible.

Off the Makrān coast, from Karachi to Gwātar, the tidal stream sets eastward during the rising, and westward during the falling tide ; but westward of Gwātar bay it sets westward during the rising, and eastward during the falling tide.

In the northern part of the Gulf of 'Omān, the general set of the stream is north-north-westward and south-south-eastward. The north-north-west-going stream attains a rate of from half a knot to 2 knots, and is strongest on the western side, as Ras Masandam is approached. The south-south-east-going stream attains a rate of from one to 1¾ knots.

In the main part of the Persian gulf the streams generally set north-westward towards the head of the gulf on the rising tide, and south-eastward toward Dōhat as Salwa and Bahrein island on the rising tide and a pronounced set away from this area on the falling tide.

The type of stream in any locality is not necessarily the same as the type of tide, and diurnal streams may occur where the tide is semi-diurnal, and vice-versa. For this reason, the time of the turn of the stream, and its rate, in any locality, bear no fixed relation to the vertical movement of the tide in that locality. *See* also pages 287 to 291.

Northward of Ras al Kūh, the streams become very strong, and they attain their greatest rate, of about 4 knots and probably more at springs, at Ras Masandam, where eddies and races are formed near that point and between it and As Salāmah wa Banāt-hā islets. On the eastern shore of the entrance of the gulf, the rate of the streams is less, and is perhaps from 2 to 3 knots off Girau. *See* also page 287.

UNIFORM SYSTEM OF BUOYAGE.—The four coloured diagrams facing this page illustrate the Uniform System of Buoyage as agreed at the London Conferences of 1933 and 1936. There are two uniform systems, the " Lateral " system and the " Cardinal " system, of which the " Lateral " system is used in the Shatt Al 'Arab and approaches ; Kuwait ; the inner channel leading to Umm Said ; and in the approaches to Bahrein harbour and Sitra anchorage (but not in Bahrein harbour.) The following is a description of this system as it is applied in these waters :—

Lateral system.—The mariner approaching the coast, having fixed his position, must note the direction of the main flood stream. For the waters included in this volume the flood stream sets up-river in the Shatt Al 'Arab ; southward and then north-westward in the inner channel leading to Umm Said ; and westward in the approaches to Bahrein, and southward in the approaches to Sitra anchorage.

The term " starboard hand " shall denote that side which would be on the right hand of the mariner either going with the main flood stream or approaching a harbour, river, or estuary from seaward. The term " port hand " shall denote the left hand of the mariner in the same circumstances.

Buoys marking the same side of a channel, estuary, or tideway, may be distinguished from each other by names, numbers, commencing from seaward odd to starboard, even to port, or letters.

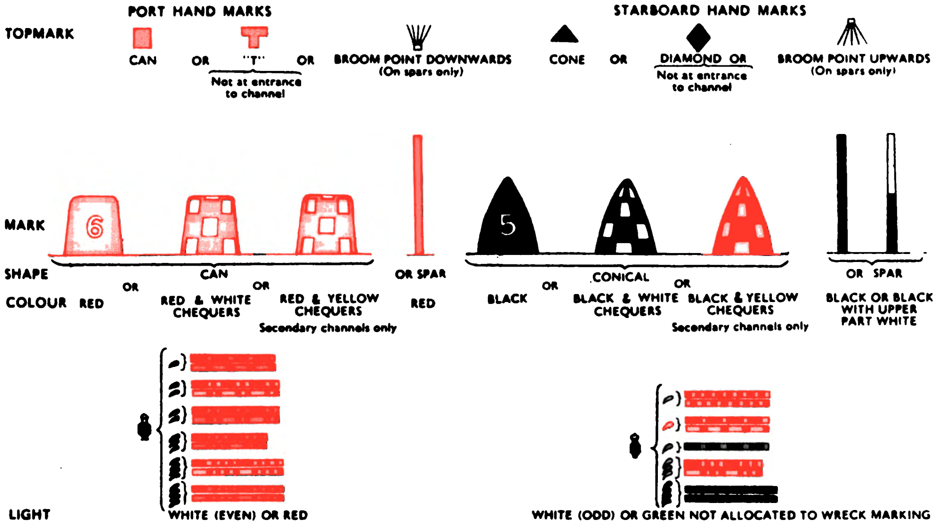
Starboard hand buoys.—Starboard hand buoys are conical and are painted black or black and white in chequers. The topmark (if any) is a black cone or, for purposes of differentiation except at the entrance to a channel, a black diamond. If lit, a *white flashing* light, having *one, three* or *five flashes,* is exhibited. *Green* lights are not exhibited from starboard hand marks in the British Isles.

Port hand buoys.—Port hand buoys are can-shaped and are painted red or red and white in chequers. The topmark (if any) is a red can, or, for purposes of differentiation except at the entrance to a channel, a red **T**. If lit, a *red flashing* light, having *any number* of flashes *up to four* or a *white flashing* light having *two, four* or *six* flashes is exhibited.

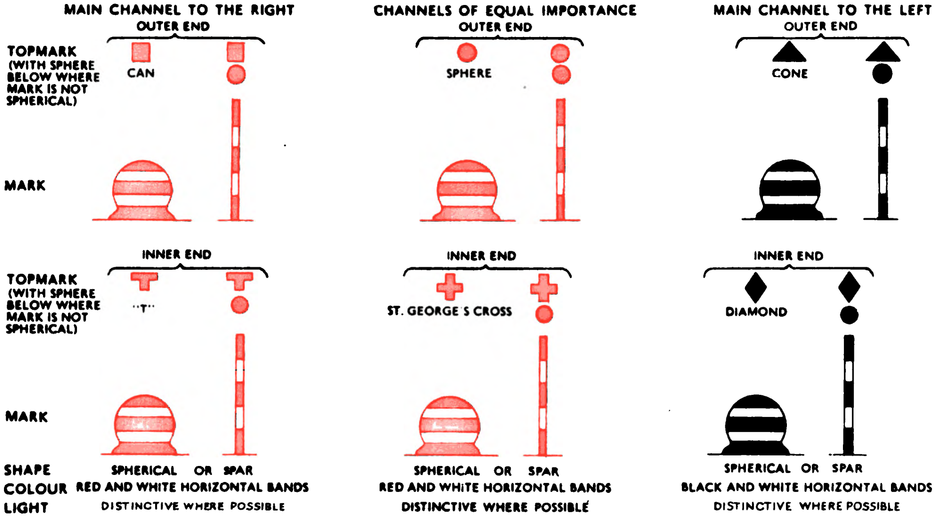
Middle ground buoys.—Middle ground buoys are spherical in shape : if the main channel lies to starboard, or if the channels are of equal importance, they are painted in red and white horizontal bands ; if the main channel lies to port they are painted in black and white horizontal bands. When topmarks are carried, if the main channel lies to starboard the outer end buoy is distinguished by a red can, and the inner end buoy by a red **T** : if the main channel lies to port the outer end buoy is distinguished by a black cone, and the inner end

DIAGRAMS ILLUSTRATING THE UNIFORM SYSTEM OF BUOYAGE

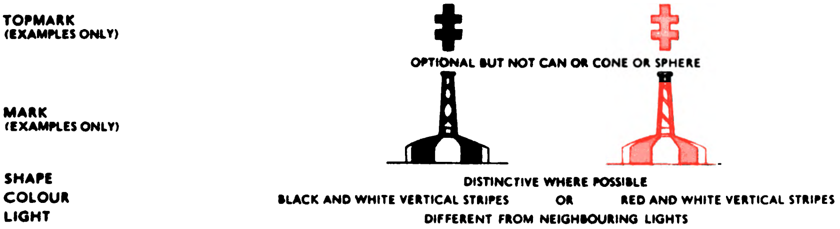
LATERAL SYSTEM



MIDDLE-GROUND OR BIFURCATION OR JUNCTION MARKS

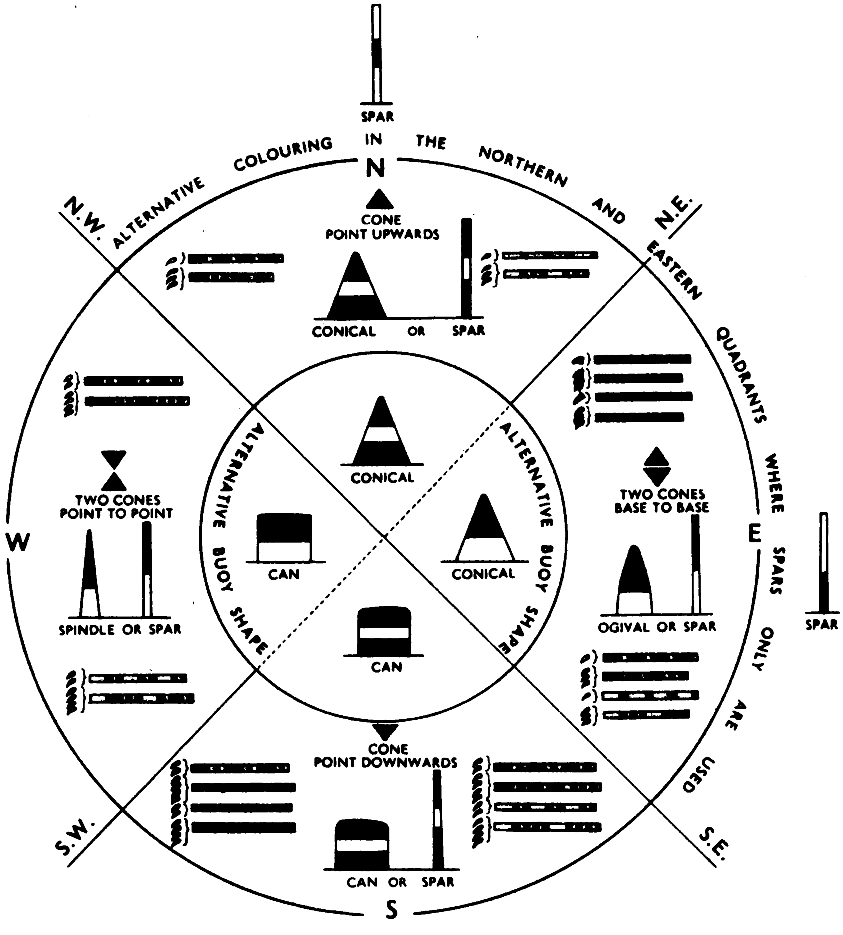

MAIN CHANNEL TO THE RIGHT
CHANNELS OF EQUAL IMPORTANCE
MAIN CHANNEL TO THE LEFT
OUTER END
OUTER END
OUTER END
TOPMARK (WITH SPHERE BELOW WHERE MARK IS NOT SPHERICAL)
CAN
SPHERE
CONE
MARK
INNER END
INNER END
INNER END
TOPMARK (WITH SPHERE BELOW WHERE MARK IS NOT SPHERICAL)
"T"
ST. GEORGE'S CROSS
DIAMOND
MARK
SHAPE
SPHERICAL OR SPAR
SPHERICAL OR SPAR
SPHERICAL OR SPAR
COLOUR
RED AND WHITE HORIZONTAL BANDS
RED AND WHITE HORIZONTAL BANDS
BLACK AND WHITE HORIZONTAL BANDS
LIGHT
DISTINCTIVE WHERE POSSIBLE
DISTINCTIVE WHERE POSSIBLE
DISTINCTIVE WHERE POSSIBLE

MID-CHANNEL MARKS


TOPMARK (EXAMPLES ONLY)
OPTIONAL BUT NOT CAN OR CONE OR SPHERE
MARK (EXAMPLES ONLY)
SHAPE
COLOUR
LIGHT
DISTINCTIVE WHERE POSSIBLE
BLACK AND WHITE VERTICAL STRIPES
OR
RED AND WHITE VERTICAL STRIPES
DIFFERENT FROM NEIGHBOURING LIGHTS

DIAGRAMS ILLUSTRATING THE UNIFORM SYSTEM OF BUOYAGE

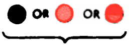
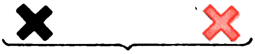
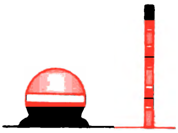
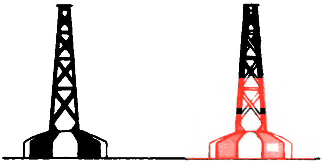
CARDINAL SYSTEM

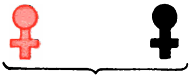
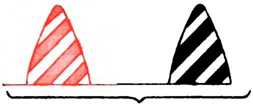
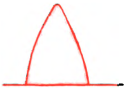


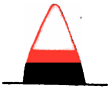
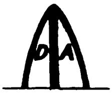
NOTE. SLIGHT MODIFICATIONS IN MINOR DETAILS TO THE ABOVE HAVE BEEN INTRODUCED BY CERTAIN COUNTRIES

DIAGRAMS ILLUSTRATING THE UNIFORM SYSTEM OF BUOYAGE

MARKS COMMON TO BOTH SYSTEMS AND OTHER MARKS

	ISOLATED DANGER MARKS	FAIRWAY MARKS
TOPMARK	 SPHERE	 OPTIONAL (SEE FOOTNOTE)
MARK		
SHAPE	SPHERICAL OR SPAR	OPTIONAL (SEE FOOTNOTE)
COLOUR	WIDE BLACK AND RED HORIZONTAL BANDS SEPARATED IF DESIRABLE BY A NARROW WHITE BAND	BLACK AND WHITE VERTICAL STRIPES OR RED AND WHITE VERTICAL STRIPES
LIGHT	FLASHING (WHITE OR RED)	FLASHING

	TRANSITION MARKS	QUARANTINE-GROUND MARKS
TOPMARK	 OPTIONAL (SEE FOOTNOTE)	
MARK		
SHAPE	OPTIONAL (SEE FOOTNOTE)	OPTIONAL (SEE FOOTNOTE)
COLOUR	RED AND WHITE DIAGONAL STRIPES OR BLACK AND WHITE DIAGONAL STRIPES	YELLOW

	OUTFALL AND SPOIL-GROUND MARKS	AREAS USED FOR NAVAL MILITARY, OR AIR FORCE PRACTICE PURPOSES
MARK		
SHAPE	OPTIONAL (SEE FOOTNOTE)	OPTIONAL (SEE FOOTNOTE)
COLOUR	YELLOW ABOVE AND BLACK BELOW	WHITE WITH BLUE CROSS

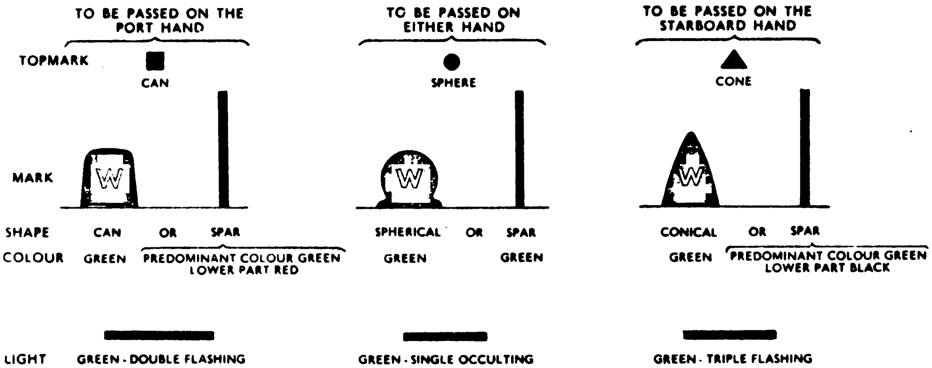
FOOTNOTE. SHAPE IS OPTIONAL AND THE ILLUSTRATIONS ARE TO BE REGARDED AS EXAMPLES ONLY THE ONLY DEFINITE REQUIREMENT IS THAT THE SHAPE ADOPTED SHALL NOT BE MISLEADING

DIAGRAMS ILLUSTRATING THE UNIFORM SYSTEM OF BUOYAGE

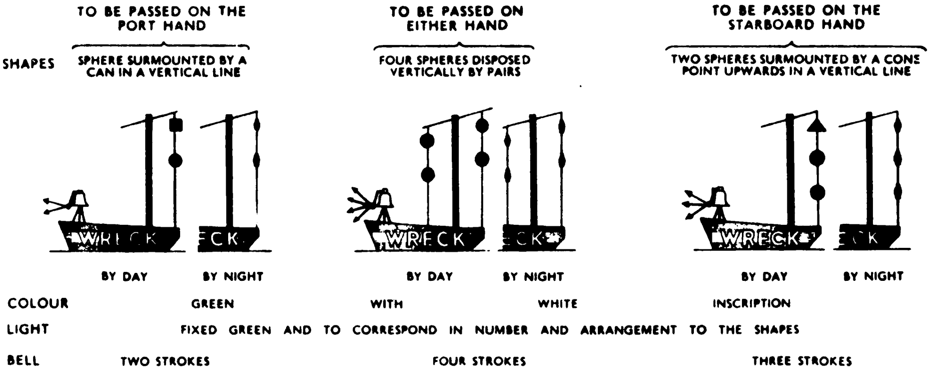
MARKING OF WRECKS

LATERAL SYSTEM

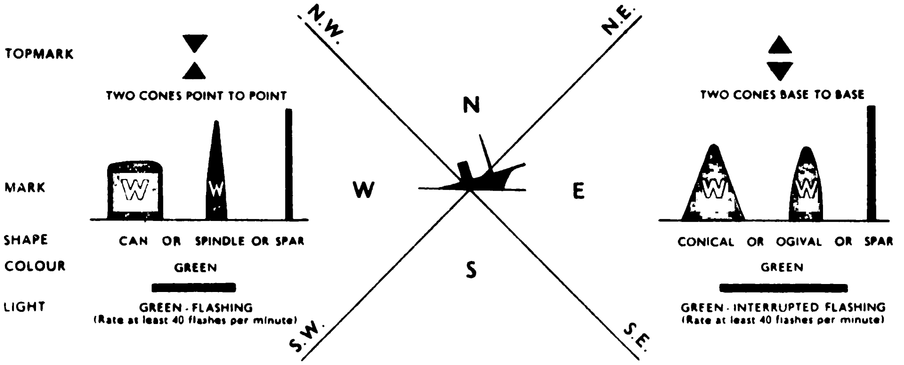
BUOYS



VESSELS


TO BE PASSED ON THE PORT HAND
TO BE PASSED ON EITHER HAND
TO BE PASSED ON THE STARBOARD HAND
SHAPES
SPHERE SURMOUNTED BY A CAN IN A VERTICAL LINE
FOUR SPHERES DISPOSED VERTICALLY BY PAIRS
TWO SPHERES SURMOUNTED BY A CONE POINT UPWARDS IN A VERTICAL LINE
WRECK
WRECK
WRECK
BY DAY
BY NIGHT
BY DAY
BY NIGHT
BY DAY
BY NIGHT
COLOUR
GREEN WITH WHITE INSCRIPTION
LIGHT
FIXED GREEN AND TO CORRESPOND IN NUMBER AND ARRANGEMENT TO THE SHAPES
BELL
TWO STROKES
FOUR STROKES
THREE STROKES

CARDINAL SYSTEM


TOPMARK
TWO CONES POINT TO POINT
N.W.
N.E.
N
W
E
S
S.W.
S.E.
TWO CONES BASE TO BASE
MARK
W
W
W
W
SHAPE
CAN OR SPINDLE OR SPAR
CONICAL OR OGIVAL OR SPAR
COLOUR
GREEN
GREEN
LIGHT
GREEN - FLASHING (Rate at least 40 flashes per minute)
GREEN - INTERRUPTED FLASHING (Rate at least 40 flashes per minute)

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21958 21214 - H.0254 -120000-9/52

buoy by a black diamond ; if the channels are of equal importance, the outer end buoy is distinguished by a red sphere, and the inner end buoy by a red St. George's cross. If lit, their lights are either *white* or *red* and are distinctive as far as possible ; neither the colour or the phase of the light are such as to lead to uncertainty as to the side on which the buoy must be passed.

Mid-channel buoys.—Mid-channel buoys are, where possible, of distinctive shapes, being neither conical, can or spherical ; they are painted in black and white, or red and white, vertical stripes. If a topmark is carried it is distinctive in shape being neither cone, can or sphere ; if lit, their lights differ from other lights in the vicinity.

Isolated danger buoys.—Buoys marking isolated dangers are spherical in shape and are painted in wide black and red horizontal bands which are usually separated by a narrow white band. If a topmark is carried it consists of a sphere painted black or red, or half black and half red horizontally ; if lit, they exhibit *white* or *red flashing* lights.

Landfall buoys (Fairway marks in the diagram).—These buoys which serve to indicate the seaward approach to a harbour, river or estuary, are similar in shape and colour to those which may be used for marking mid-channels (*see* above) ; if lit, they will exhibit *flashing* lights.

Miscellaneous buoys.—Buoys marking spoil grounds or sewer outfalls are not considered as navigational buoys, but are generally of the appropriate shape as for channel marking ; they are painted horizontally, the upper half yellow, and lower half, black.

Quarantine ground marks are defined as yellow in colour and of optional shape having regard to the rules for channel marking ; they are seldom used in the British Isles.

Buoys intended for moorings or other purposes not included above, may be of any shape or colour (other than green) according to the discretion of the authority within whose jurisdiction they are laid, but not such as might lead to confusion with buoys whose purpose is defined above.

Buoys marking submarine telegraph cables are usually black, with the word " telegraph " painted on them in white letters.

Buoys fitted with sound signal devices will have, if practicable, the characteristics appropriate to their positions in accordance with the foregoing rules.

Note.—Spar buoys are rarely used, but may be found in some ports ; as regards colour, they generally conform to the rules for channel marking, *see* diagrams. For wreck-marking spar buoys, (seldom used) *see* diagrams.

Caution.—In certain cases slight modification to the above rules may be found where local circumstances make it desirable. Full particulars will be found in the appropriate place in the body of this book which should invariably be consulted.

LIFE-SAVING.—Life-boats and Life-saving appliances form the principal means adopted for saving life.

The line-throwing apparatus, the principal life-saving appliance, can often be used with effect when a life-boat is not available ; its success, however, depends largely upon an intelligent co-operation on the part of the crew of the stranded vessel.

Signals.—In accordance with the International Convention for the Safety of Life at Sea, 1948, Chapter V, Regulation 16, the following signals shall be used by life-saving stations when communicating with ships in distress and by ships in distress when communicating with life-saving stations :—

(*a*) *Replies from shore station to distress signals made by a ship* :—

Signal	*Signification*
By day—White smoke signal *By night*—*White* star rocket	" You are seen—assistance will be given as soon as possible."

(*b*) *Landing signals for the guidance of small boats bringing away the crew of a wrecked ship* :—

Signal	*Signification*
(i) *By day*—Vertical motion of a white flag or the arms *By night*—Vertical motion of a *white* light or flare. A range (indication of direction) may be given by placing a steady *white* light or flare lower and in line with the observer.	" This is the best place to land."
(ii) *By day*—Horizontal motion of a white flag or arms extended horizontally. *By night*—Horizontal motion of a *white* light or flare.	" Landing here highly dangerous "
(iii) *By day*—Horizontal motion of a white flag, followed by the placing of the white flag in the ground and the carrying of another white flag in the direction to be indicated. *By night*—Horizontal motion of a *white* light or flare, followed by the placing of the *white* light or flare on the ground and the carrying of another *white* light or flare in the direction to be indicated.	" Landing here highly dangerous. A more favourable location to land is in the direction indicated."

(*c*) *Signals to be employed in connection with the use of shore life-saving apparatus*:—

Signal	*Signification*
(i) *By day*—Vertical motion of a white flag or the arms. *By night*—Vertical motion of a *white* light or flare.	*In general*—"Affirmative." *Specifically*:— " Rocket line is held. " " Tail block is made fast." " Hawser is made fast." " Man is in the breeches buoy." " Haul away."

(ii) *By day*—Horizontal motion of a white flag or arms extended horizontally. *By night*—Horizontal motion of a *white* light or flare.	*In general*—" Negative." *Specifically*:— " Slack away." " Avast hauling."

AIR LIGHTS.—Mariners are warned that lights (with definite characteristics), which are not ordinary navigational aids, may be exhibited for the use of aircraft from structures near the coasts described in this volume.

These lights are often of great luminous power and altitude and may be the first lights or looms of lights sighted when making a landfall at night; they normally have the following characteristics:—

(a) *Flashing White* (revolving beam type).

(These lights are usually screened from seaward but their looms may be visible).

or (b) *Alternating flashing white and green* (revolving beam type).

or (c) *Flashing two letter groups* in the Morse Code, in *red* or *green*.

(Although the groups made by these lights may have definite meanings in the International Code of Signals, their signification is to be disregarded; the fact that they are *red* or *green* in colour, and flash with mechanical regularity, should prevent their being mistaken for signals from shore signal stations or ships).

Air lights which appear likely to be visible from seaward will be shown on charts and described in the Admiralty Lists of Lights. As they are subject to changes of which prompt notification to the mariner may not always be possible, care should be taken that they are not confused with marine navigational aids.

PORT REGULATIONS.—**Persia.**—The following are extracts from the regulations for the ports of Persia, dated 14th of January, 1939:—

Article XXIV.—Before entering a port a vessel must display a square yellow flag until the completion of the quarantine formalities. With the exception of the pilot and the official of the Public Health Administration, no person may board or leave the vessel before completion of the quarantine formalities and the medical inspection.

Authority for the vessel to establish communication with the shore will be given after the completion of the quarantine formalities and when it has been confirmed that there is no danger of any epidemic on board. The quarantine flag may then be hauled down.

Article XXVIII.—The Master of every vessel arriving at a Persian port is required to carry out the following formalities:—

(1) To display the Persian flag at the foremast so long as the vessel remains in Persian territorial waters.

(2) To give at least 24 hours' notice to the Port Office of his intended arrival if the vessel is foreign, and to produce, on request, her plan and log which must be signed on each page, the blank spaces being ruled through and signed.

(4) Customs formalities: A document must be transmitted to the Port Office, within 24 hours of arrival, giving the name of the vessel, her tonnage, itinerary, the name of the owner, a nominal list of passengers and crew, a copy of the manifest and details of the cargo consigned to the port.

(5) The berth for each vessel will be assigned by the Port Administration with due regard to the views of the Customs Administration. The Master of the vessel must retain in the vicinity of the port a sufficient number of men in order that the vessel may be moved in case of necessity, or, if so directed, by the authorities.

Article XXIX.—No vessel may discharge her cargo at any place where there is no Customs Office or establish communication with the shore there.

Article XXXV.—No vessel may leave a Persian port or the coast without permission which will be granted at once after the completion of the necessary formalities and the payment of Customs charges and port dues.

Article XLIII.—Masters of vessels having explosive or inflammable substances on board are required to give notice thereof to the Port Administration before entering.

Article XLIV.—No vessel may enter a port or proceed alongside before having discharged any dangerous substances which have reached their destination. The Customs Administration must be notified in advance.

Article LVIII.—Vessels navigating in narrow waterways, canals and inlets must reduce speed as necessary and pass at a sufficient distance from vessels displaying a red flag.

SUBMARINE CABLES.—The following Articles are taken from the " International Convention for the Protection of Submarine Telegraph Cables of 14th March, 1884 ":—

Art. II. It is a punishable offence to break or injure a submarine cable, wilfully or by culpable negligence, in such manner as might interrupt or obstruct telegraphic communication, either wholly or partially, such punishment being without prejudice to any civil action for damages.

This provision does not apply to cases where those who break or injure a cable do so with the lawful object of saving their lives or their ship, after they have taken every necessary precaution to avoid so breaking or injuring the cable.

Art. V. Vessels engaged in laying or repairing submarine cables shall conform to the regulations as to signals which have been, or may be, adopted by mutual agreement among the High Contracting Parties, with the view of preventing collisions at sea.

When a ship engaged in repairing a cable exhibits the said signals, other vessels which see them, or are able to see them, shall withdraw to or keep beyond a distance of one nautical mile at least from the ship in question, so as not to interfere with her operations.

Fishing gear and nets shall be kept at the same distance.

Nevertheless, fishing vessels which see or are able to see a telegraph-ship exhibiting the said signals shall be allowed a period of twenty-four hours at most within which to obey the notice so given, during which time they shall not be interfered with in any way.

The operations of the telegraph-ships shall be completed as quickly as possible.

Art. VI. Vessels which see, or are able to see, the buoys showing the position of a cable when the latter is being laid, is out of order, or is broken, shall keep beyond a distance of one-quarter of a nautical mile at least from the said buoys.

Fishing nets and gear shall be kept at the same distance.

Art. VII. Owners of ships or vessels who can prove that they have sacrificed an anchor, a net, or other fishing gear in order to avoid injuring a submarine cable, shall receive compensation from the owner of the cable.

In order to establish a claim to such compensation, a statement, supported by the evidence of the crew, should, whenever possible, be drawn up immediately after the occurrence; and the master must, within twenty-four hours after his return to or next putting into port, make a declaration to the proper authorities.

The latter shall communicate the information to the Consular authorities of the country to which the owner of the cable belongs.

Caution.—Cautionary Notes appear on many charts, calling attention to areas in which there are submarine telegraph cables, these areas being indicated by pecked lines on the charts.

Every care should be taken to avoid anchoring in such areas, even though there may be no specific prohibition against doing so, in view of the serious interference with communcations which results from damage to submarine cables. Equal care should be taken wherever the symbol for a submarine cable (a wavy line) is shown on a chart.

Danger involved in cutting a submarine cable to clear anchors or fishing gear.—In the event of any vessel fouling a submarine cable in these areas, every effort should be made to clear the anchor or gear by normal methods; should these efforts fail, the anchor or gear should be slipped and abandoned *without attempting to cut the cable. High voltages are, or may be, fed into certain submarine cables; serious risk exists of loss of life due to electric shock, or at least of severe burns, if any attempt to cut the cable is made.* No claim in respect of injury or damage sustained through such interference with a submarine cable will be entertained.

Compensation for anchors or fishing gear sacrificed in order to avoid injuring a submarine cable can be claimed under the Submarine Telegraph Act of 1885 (Schedule of Submarine Telegraphs Convention, Article VII).

PILOTAGE.—In the Persian gulf, generally, pilots are now seldom employed, especially as the men offering their services usually possess local knowledge only.

For pilots for particular places, such as the Shatt al 'Arab and Bahrein harbour, etc., *see* the body of this work.

DERATISATION.—In accordance with Article 17 of the International Sanitary Regulations, Deratisation can be carried out and Deratisation and Deratisation Exemption certificates can be issued to vessels at the following place within the limits of this work:—Bushire and Basra.

NATIVE CRAFT.—Part of the trade between the Persian gulf and India, the Red sea, and the East coast of Africa, is carried on in native vessels called by the Arabs *bāgala* and *bum*, similar Indian-built vessels being called *kutiyah* and *dangiyah*, respectively.

The bāgala and dangiyah are clumsily rigged vessels, of from 100 to 400 tons, with a huge mainmast and lateen sail, and a small lateen mizen. They sail well in moderate winds, but do not go to sea in the South-west monsoon. The *balam* is a somewhat similar craft, though smaller.

The smaller vessels used in the pearl fishery and for the coasting trade, of from 10 to 120 tons, are called *sambuq, shu'ai, jalibut, mashuwah, batil,* and *bākara*; they are all rigged similarly to the bāgala, except that they do not have the mizen and smaller lateen sail. The sambuq is pre-eminently the pearling boat of Kuwait and Bahrein, though the jalibut and mashuwah are also commonly used as such.

The term *dhow* is unknown to the natives of the Persian gulf littoral, but is used by Europeans to denote any native craft.

FUEL.—Coal can be obtained at Basra. Fuel oil can be obtained at Abādān and Basra.

REPAIRS.—UNDER-WATER.—Repairs can be effected at Abādān and Basra.

For particulars of docks and patent slips, *see* Appendix I.

STANDARD AND SUMMER TIMES.—All information regarding Standard Times and Summer Times will be found on the Admiralty List of Radio Signals, Vol. V.

CONSULS.—British Consular Officers are stationed at Bahrein, Dōha, Gwādar, Kuwait, Muscat, Qatar and Sharjah.

COMMUNICATIONS.—There is regular communication by power vessels between India, Bushire, Khorramshahr and Basra, and there is a subsidiary service between India and the ports and anchorages on the Makrān coast and in the Persian gulf.

There is communication by air between Europe, Baghdād, Basra (Ma'Qil), Bahrein, Shārjah and India. There are also services by air between Bushire and other towns in Persia. There are many local services.

For those ports which are connected to the general telegraph and telephone systems *see* the body of this work.

RADIO STATIONS.—Coastal radio stations in the area covered by this volume, which are open for public correspondence, are established at Muscat, Jāsk, Bushire, Manāma (Bahrein in List), Fao control, Abādān, Ma'qil (Basrah Margil in List). For details *see* List published by the General Secretariat of the International Telecommunication Union.

For details of Radio stations which transmit weather bulletins, storm signals, time signals, etc., *see* Admiralty List of Radio Signals, Volumes III and V.

PASSAGES.—For information concerning passages to and from the Persian gulf and the Gulf of 'Omān, the mariner is referred to the work entitled " Ocean Passages ", published by the Hydrographic Department of the Admiralty.

In the area covered by this work, power vessels may steer direct from point to point, but the following information may be useful.

When navigating up or down the gulf vessels should keep along the Persian shore; when visiting the Arabian shore, vessels should always anchor at dusk, if possible.

The numerous islands and strong tidal streams near the entrance of the gulf necessitate caution. Strong breezes may set in and sudden shifts of wind may occur with little or no warning.

During a shamāl, especially in summer, and also while the nashi is blowing in the southern part of the gulf in winter, the very hazy state of the atmosphere so completely obscures the land that the surf on the beach may be the first intimation of its proximity.

Chart 2851, 38.

Approaching the gulf.—When bound up the gulf, calling at Muscat, it is usual to make the Arabian coast, which in the fine season is generally visible from a great distance, especially at sunset. The high land between As Sūr and Ras Abu Dāud is first seen, and the Devil's gap may be identified.

During the South-west monsoon, vessels should pass about 3 miles off Ras al Hadd; the high land will probably not be visible until off As Sūr or Kalhāt, and, owing to the haze, may not be seen at all if far offshore, except about sunset when it often shows up.

Chart 753.

Muscat to the Strait of Hormuz.—From Muscat vessels should steer to pass Ras al Kūh and As Salāma wa Banāt-hā islets at a convenient distance. With a shamāl, to avoid the current and heavier swell on the Arabian coast, it is best to keep over towards the Persian coast. This coast is fairly steep-to and safe of approach eastward of Ras Jāsk, but it is low, and the hills are a considerable distance inland. It should, therefore, be given a wide berth at night. From Jāsk, the coast continues low northward to Kūh-e Hormuz, and the hills in the background render it difficult to judge the distance offshore. Soundings are of little use as a guide.

The tidal streams off the Arabian coast, northward of Jazīrat Līma, are very strong, especially northward of Jazīrat Umm al Faiyārīn, and the depths are too great for anchoring.

Strait of Hormuz to Jazīrat Tunb.—From Ras al Kūh to Jazīreh Hangām, (Henjām) the tidal streams become strong across the entrance. On passing As Salāma wa Banāt-hā, vessels should guard against the north-going stream.

The Suhali here blows from between west-south-west and south-west, and the lee shore must not be closely approached. There is sheltered anchorage northward of Kūh-e Hormuz, or off the town of Qishm.

The flat off the south-western end of Qishm island requires caution when approaching it; discoloured water marks its edge, and fishing boats often anchor there.

Charts 753, 2830.

Jazīrat Tunb to Jāzīreh Qais.—Vessels may pass on either side of Coote rock, Jazīrat Tunb, and Jazīrat Nabiyu Tunb. Jazīreh-e Farūr, which shows well at night unless the weather is hazy, and Jazīreh Qais should be passed on their southern sides.

In a shamāl there is less sea near the Persian shore than at a distance off it.

Vessels should guard against a northerly set which is sometimes experienced in the area between Jazīrat Tunb and Jazīreh Shaikh Shu'aib.

During a shamāl, haziness of the air may render the greatest caution necessary in making or passing any of the islands, sounding affording no guide. Jazīreh-e Farūr is the easiest to see, it being dark coloured, high, and steep-to, with the exception of a small ledge on its western side.

Charts 2858, 748b

Charts 753, 2830.

Shelter cah be obtained during a kaus either off Chārak or in Bandar Mughu, but it is necessary to anchor well in, where there is shelter in a shamāl, or everything must be ready to proceed to sea at short notice. Between Lingeh and the Bāsīdū flat there is not much sea in easterly winds.

Charts 2830, 2837, 2847.

Jazīreh Qais to Ras al Mutāf.—Vessels should pass southward of Jazīreh Hindarābī and Jazīreh Shaikh Shu'aib and then south-westward of Ras al Mutāf; the mud-coloured water over the shoal extends some miles outside it, and is a good indication of its vicinity by day.

A vessel passing south-westward of Ras al Mutāf in thick weather, or at night, should proceed with caution and not approach within depths of 15 fathoms (27$^{\text{m}}$4).

From Jazīreh Qais to Ras al Mutāf the smoothest water is inside the islands, and this route can be taken in daylight.

The channel between Jazīreh Shaikh Shu'aib and the mainland, where there is anchoring ground, is clear, but neither the sandy shoal off the low eastern point, nor the western end of the island, should be approached closely.

Shelter from the shamāl can be obtained off Chīrū, off the eastern end of Jazīreh Shaikh Shu'aib, off Shīvūh, and under Ras al Mutāf shoal.

Bandar Nāband affords shelter from a kaus, but, if a strong shamāl follows a heavy sea would set in. Bandar Nakhīlū is the best anchorage in a kaus.

Soundings afford no guide in passing Jazīreh Hindarābī and Jazīreh Shaikh Shu'aib, they being steep-to, nor are they of any assistance outside the bank extending from the southern side of Jazīreh Qais.

Chart 2847.

Ras al Mutāf to Bushire.—From a position about 10 miles south-westward of the islet of Nakhīlū (page 143), a vessel should steer to pass about 6 miles south-westward of Ras Halīleh (page 147). The coast in the vicinity of Ras al Khān, 15 miles north-north-westward of Jazīreh Nakhīlū, is very low, but the mountains, about 4 miles inland, extending about 40 miles northward from a position about 9 miles northward of Ras al Khān, show up well. After passing Ras Halīleh the vessel should follow the directions given on page 151.

Bushire to Shatt al 'Arab.—A vessel after clearing the shoals off Bushire may steer direct for a position about 3 miles south-eastward of Palinurus shoal (page 254) and thence through Khōr al Amaya to the entrance to New channel.

If, when off the bar, a kaus suddenly sets in, and it should be necessary to anchor, the Maidan 'Alī appears to afford the best anchorage, as it is stated that over this bank the force of the sea is less than in the channels or farther seaward.

CLIMATE AND WEATHER.—The weather in the area covered by this volume is, for the most part, hot and dry, with little cloud. From May to October the heat is often trying to Europeans, but there is a marked improvement in autumn, and winter is comparatively cool, especially at the head of the Persian gulf. Gales are not common; they mostly take the form of squalls, and are dangerous because the

Charts 2858, 748b.

barometer rarely gives warning of their approach, and because severe duststorms often accompany them, which may in some cases reduce visibility to a few yards. Mirage is very common, especially on the Arabian side of the Persian gulf (see standard article on page xxxii). The annual rainfall ranges from about 3 to 11 inches, and comes mainly in brief downpours from November to April.

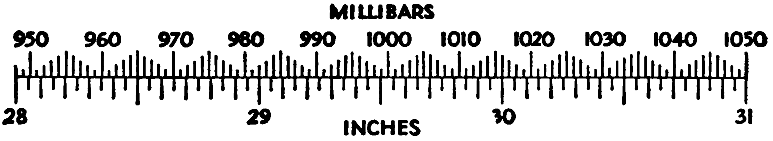
The south-west monsoon which prevails over the Arabian sea from about June to September does not reach any of these coasts but sends a considerable swell along the whole of the coast between Cape Monze and Jāsk, and, in most years, there is an occasional spell of bad weather with easterly winds, during this monsoon. The north-east monsoon is felt along this same coast from about December to March, and squally winds from some northerly point are then common.

Pressure.—From November to March pressure is often highest northward, north-eastward, or eastward of the area covered by this volume, but from May to September, the months when depressions are frequently centred over the north-western part of the Indian sub-continent, average pressure is rather low over an area which extends from the Sudan north-eastward to include most of Asia. The distribution of pressure in the transitional months of April and October may either be of a winter or of a summer type.

The barometer is an unreliable indicator of the approach of bad weather even in winter, particularly in the Persian Gulf.

There is a diurnal variation of pressure, with maxima at about 1000 and 2200 and minima at about 0400 and 1600, local time, with a range of two or three mb., but in winter the evening maximum and early morning minimum are sometimes absent or very small.

The following diagram shows the equivalent of millibars in inches, and vice-versa:



Depressions.—*Western depressions.*—Disturbances having frontal characteristics, such as those described in the standard article on page xxxv move eastward across the area covered by this volume from about November to April. They are known to the India Meteorological Department as "Western disturbances". In April the track of the parent depression often lies northward of this area. These depressions are of little depth, even when the winds associated with them are strong. In the majority of cases pressure does not fall below 1000 mb. at the centre, and in some cases does not fall below 1015 mb.

The time taken by a depression to cross the area is generally between two and four days, and there may be as many as eight depressions during a winter month.

On the coast the approach of such a disturbance is generally shown by an increase in cloud, and sometimes by some rain or drizzle; the wind usually blows from directions between east and south. With the arrival of the cold front the wind veers to between west and north, and the sky generally becomes clear and visability very good. At sea, however, there is often very little cloud in front of such a depression.

Eastern depressions.—Occasionally, between June and September, depressions develop in the northern part of the Arabian sea or enter that part of the Arabian sea from an easterly or southerly direction, and sometimes one develops into a cyclone (see standard article on tropical revolving storms, page xxxvii.

Tropical revolving storms, or "cyclones".—Most of the cyclones that have occurred in the Arabian sea between April and December have been too far south to affect any part of the area covered by this volume, except perhaps by causing a swell on the coast of Baluchistān and on the shores of the Gulf of Omān. At intervals averaging about five years, however, a storm centre has crossed some part of these coasts, and one or two have almost reached the entrance to the Persian gulf.

Within the last hundred years, three are known to have entered the area between the beginning of April and the end of May but in the month of June alone there have been at least six, which have all arrived from some direction between south and east. It is probable that most if not all of these storms had lost much of their vigour on reaching this area.

Between July and December very few storms have entered the area, but in November several have passed north-eastward from the Arabian sea to the mainland of the Indian sub-continent, crossing the coast between Bombay and Karachi, and some of these storms may have caused bad weather on the coast of Baluchistān.

Winds.—The standard article on " Local modification of the weather near the coast", page xlviii applies to the area covered by this volume. For instance, the deflection of winds so that they blow along the direction of a strait, described in paragraph (1) of that article, is a common occurrence in the Strait of Hormuz. Moreover, land and sea breezes as described, are common on the coasts, even in winter. On most of the Arabian side of the Persian gulf, between the vicinity of Bahrein and about Lat. 29° N., the sea breeze is northerly and the land breeze westerly to north-westerly. There is no region within the area covered by this volume where a regular alternation of onshore and offshore winds at right angles to the coast is to be expected.

Persian gulf.—In the Persian gulf over the sea the most common wind is the "shamāl" which blows from between west-north-west and north-north-west. In May and June and from October to December this wind is experienced on about four occasions out of every ten, but in August on rather less than three occasions out of ten. The shamāl seldom reaches Beaufort force 6 and rarely Beaufort force 8 in this region; even in winter a north-westerly wind of force 8 was observed on only four occasions out of about 1600.

Northerly winds in the Persian gulf are less than half as frequent as the shamāl, westerly winds about one-third and south-easterly winds about one-fifth.

The south-easterly winds are known as " kaus " in Arabic and " sharki " in Persian.

In addition to the shamāl and kaus there are two other winds to which the natives have given names. They are the " suhaili " and the " nashi ".

The suhaili is a south-westerly wind. In the Persian gulf it may be the prevailing wind at a few places on the Arabian side where the run of the coastline favours such a wind direction, and also on the coasts on either side of the Strait of Hormuz. Long spells of suhaili are, however, very uncommon at sea, for in most depressions that cross the

Persian gulf, or pass a little to northward, the kaus is followed either immediately or after a very short interval by the shamāl, and wide "warm sectors" with south-westerly winds as described in the standard article on depressions (page xxxv) are very exceptional.

The nashi is a north-easterly wind which occurs in winter on the eastern side of the Persian gulf, especially near its entrance, and eastward to Cape Monze. It is generally squally, with frequent lulls, and often very gusty during the squalls. A nashi often continues for several days and is usually accompanied by a high barometer; it seldom reaches its greatest strength until late in the spell. The nashi sometimes strengthens over lower Persia on the approach of a western depression, and secondary disturbances may develop, with much cloud and rain, especially on the hills. For example, north-easterly winds with cloud and rain may occur between Jazīreh Hangām and Lingeh when a western depression is approaching Bushire.

Gulf of Omān.—In the Gulf of Omān over the open sea from December to March the wind is very variable; it blows most often however from directions between west and north-east, especially from north-west, and these north-westerly winds have on rare occasions reached Beaufort force 8 or more. In April and May winds are light and variable, but from June to about the end of September blow mainly from between south and east, and, although generally light, occasionally reach Beaufort force 5 or 6. In October and November there is a return to light variable winds.

Baluchistān coast.—There are hardly any observations from the open sea immediately southward of this coast. It is probable, however, that from about December to March, the period of the north-east monsoon, winds are mainly northerly and mostly of moderate strength. In other months, especially from about June to September when the south-west monsoon prevails over the Arabian sea, although winds are still mainly light they probably blow slightly more often from between south and west than from other directions. Strong winds from northward or north-eastward, however, occur now and again during these months when a depression or cyclone enters the northern part of the Arabian sea.

Squalls.—Squalls have been recorded in all months in all parts of the area covered by this volume. They are dangerous in these regions mainly because of their frequent association with duststorms. Violent squalls associated with duststorms are most likely to occur in autumn in the vicinity of the Strait of Hormuz and probably also in all parts of the area. A long rainless period normally ends in autumn and the hinterland is then at its driest; when the cold fronts of the first few winter depressions reach these dusty shores turbulent weather of one kind or another is bound to develop. The Arab fishermen in the vicinity of the Strait of Hormuz call the autumn squalls "Uhaimir"; no native vessel will put to sea when there are signs that one may be approaching, or during any squally unsettled weather in this season. At Jazireh Hangām two such squalls were encountered by H.M. ships in 1925, one on September 19th, the next on October 2nd. In the first the wind, which was easterly at the first onset, did not exceed Beaufort force 5 to 6; visibility, however, was reduced by dust to less than one cable. The second began at dawn, after an ominous gathering of heavy cloud west-south-westward, with a sudden onset of wind of at least Beaufort force 8 and with driving sand. Until torrential rain removed this sand it was impossible to see anything at all on deck. Later, after a lull, the wind rose again and reached force 11. After the storm 250 dhows were missing.

Bad squalls may occur with little or no dust, especially in winter. Off the western coast of the Masandam peninsula in January 1923, there were several squalls between the evening of the 17th and the morning of the 19th. These were associated with an onset of a shamāl, and in two of them the wind reached force 10, with torrential rain and an extraordinary display of lightning.

Sudden squalls known as " guttras " are frequent in April and May on the River Tigris, especially in the neighbourhood of 'Ali Sharqi.

Waterspouts may occur in any part of the area covered by this volume.

Cloud.—There is more cloud in winter than in other seasons, but in all seasons the amount is small, and there is no predominating type of cloud. Averages of cloud amount in each month, and of the number of mainly cloudy days and of days with little or no cloud, are given for a number of coastal stations in the climatic tables on pages 28 to 36.

Rain.—Average annual rainfall is small on all coasts, ranging from about 3 inches at Bahrein (Muharraq) to nearly 11 inches at Bushire. There is practically none from May to October, except on rare occasions on the coast of Baluchistān.

Most of the rainfall is the result of brief downpours, generally associated with cold fronts and winds from between west and north, and often with thunderstorms that occur near such fronts (see standard article on depressions under the heading "Lows", page xxxv.) At Bahrein, on November 13th and 14th, 1940, there was a fall of 2·6 inches. Downpours of this magnitude generally cause much damage.

Monthly averages of rainfall, and of the number of days per month with appreciable rain, are given in the climatic tables on pages 28 to 36.

Thunderstorms.—The frequency of thunderstorms is small on all coasts, even from November to April.

Fog and Visibility.—Fog appears to be almost unknown between May and August on exposed coasts throughout the area, and even in sheltered inlets and estuaries is probably infrequent in all months. Dust haze, on the other hand, which is uncommon from August to March, begins to increase in April, and is present rather more often than not in July, becoming much less prevalent in August. It is closely associated with the shamāl and probably also with the rainfall of the previous winter over Persia and 'Iraq. Thus in a summer with frequent shamāl of more than normal strength, following a very dry winter, long spells of dust haze are to be expected, and more dust-storms than usual.

Temperature.—*Air Temperature and Humidity.*—Averages of extremes of temperature and relative humidity for a number of places are shown in the climatic tables on pages 28 to 36.

Winter is warm (nearly as warm as is summer on the south-eastern coast of England) except in the northern part of the Persian gulf; in Shatt al 'Arab winter nights become progressively colder with increasing distance from the sea; at Basra (Ma'qil airport) temperatures below 40°F. are to be expected at night with occasional frost, although the days are mostly warm, with temperature occasionally reaching 80°F. during the afternoon.

In spring a general decrease in the amount of cloud at the head of the gulf and in the Shatt al 'Arab causes a rapid rise of temperature in those regions, and in May the considerable degree of dry heat already established in other parts of the area covered by this volume begins to be felt. Afternoon temperatures of at least 100°F. are of common occurrence nearly everywhere in May and succeeding months.

In summer and early autumn the average temperature ranges from about 80°F. to 90°F., and conditions are trying for Europeans because the heat is seldom tempered by winds of more than moderate strength. In some parts these conditions are aggravated by frequent calms and much reflected heat from the mountains of the hinterland. In the Gulf of Omān the air generally becomes a little damper in August and September, and this adds to the discomfort. The arrival, however, of heavy squalls, such as those described under "Winds" on page 23, marks the beginning of the cooler and clearer weather typical of the second half of autumn.

Sea Surface Temperature.—The average temperature of the sea surface in February and August is shown in figures I and II, these being the months when over most of the area it is at its lowest and highest respectively.

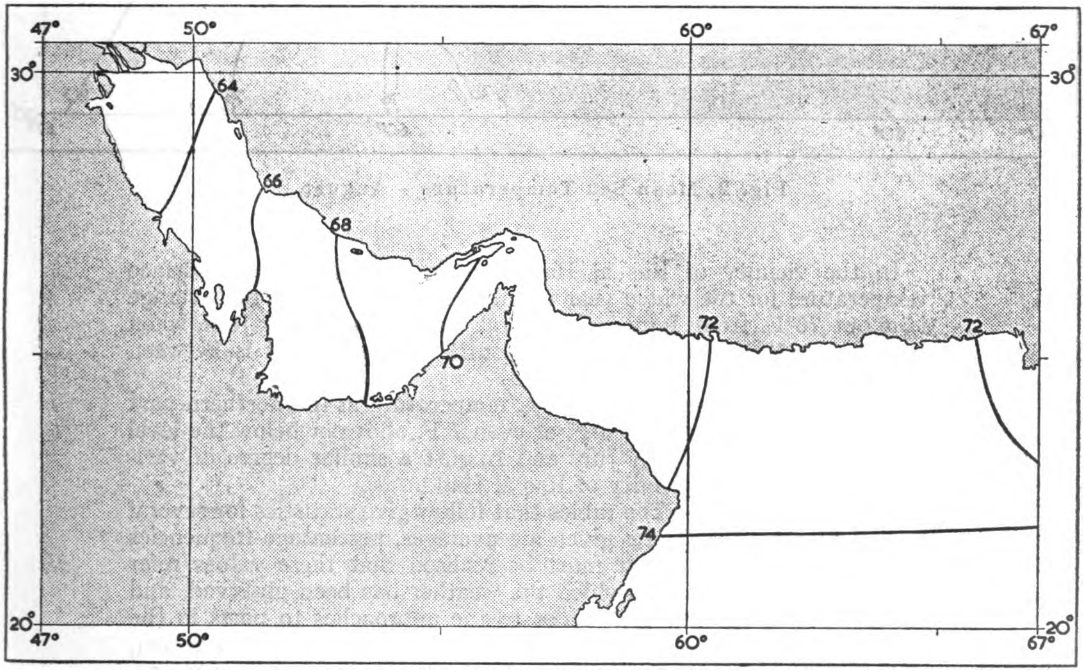


Fig. 1, Mean Sea Temperature – February.

In the area covered by figures I and II, the difference between the mean air temperature and the mean sea temperature never exceeds 3°F. ; hence the absence of shading which appears on many similar diagrams in other Pilots.

The difference between mean sea surface temperatures in winter and in summer is greatest near the head of the Persian gulf. In this area, from January to March, mean sea surface temperature is below 70°F. but throughout the entire gulf and in the Strait of Hormuz in August, the mean is slightly above 90°F.

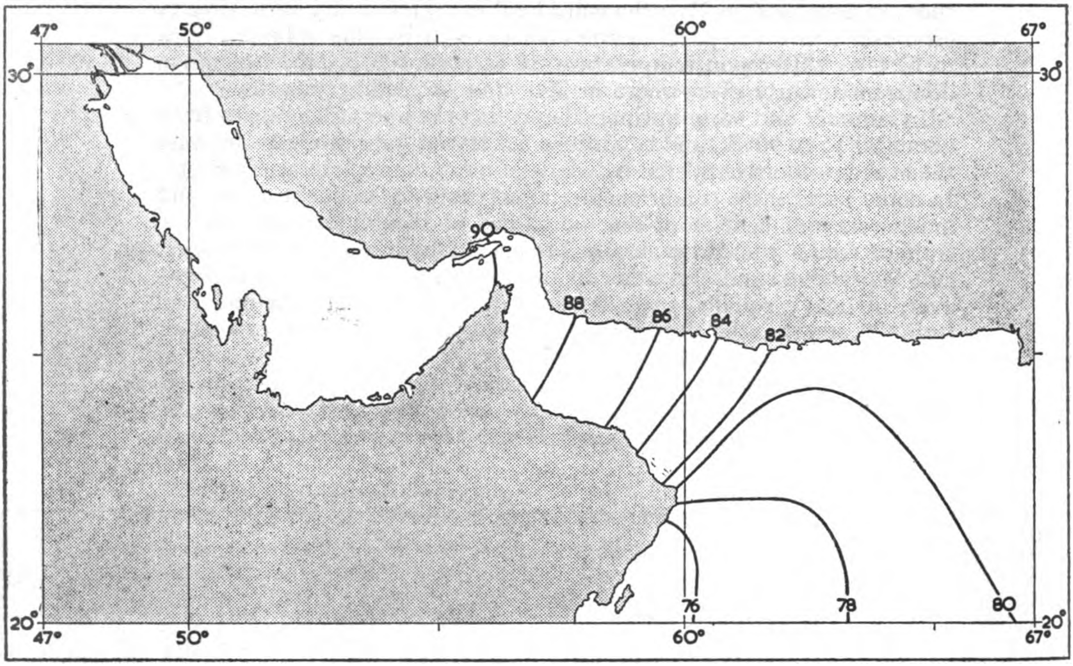


Fig. 2, Mean Sea Temperature – August.

In the vicinity of Ras al Hadd, where the average sea surface temperature for the whole year is only just below 80°F., the average is about 76°F. from January to March and is highest in June when it reaches 84°F. In the last six months of the year it is between 79°F. and 80°F.

On individual days in winter, sea temperature in the northern part of the Persian gulf may be 5°F. or even 7°F. above or below the level indicated in figure I. In July and August a similar degree of variability exists in the vicinity of Ras al Hadd.

Climatic Tables.—The tables that follow give statistics for several land stations. The figures given are averages, percentage frequencies or extremes, as stated; it must be realised that these values refer to the actual positions in which the weather has been observed, and *not* necessarily to the open sea or to the approaches to ports in the vicinity. The tables should therefore be consulted with discretion, since all the elements are affected, some a great deal, by local conditions. The following notes indicate ways in which conditions over the open sea may differ from those at the nearest reporting land station.

(1) Temperature at sea is less variable than over the land; for example the nights are generally warmer at sea and the days cooler, than over the land.

(2) Rainfall at most stations in this area is affected by mountain ranges, whose influence generally decreases with increasing distance from the land.

(3) The frequency of cloudy days on land often differs widely from the frequency a few miles out at sea, and similarly for days of little cloud.

(4) Wind speed is generally greater at sea than on land, and there may be several times as many gales at sea as at the nearest shore station, if the shore station is sheltered in those directions from which most of the gales blow at sea. Such a difference would not exist if the shore station were in an open position on a low lying island devoid of shelter. Wind direction may also be greatly affected (see " Local modification of the weather near the coast ", page xlviii).

(5) The wet fogs that occur now and again on the coast are nearly always of small extent and short duration. They are seldom associated with fog at sea.

PLACE—MUSCAT. LAT. 23° 37′ N. LONG. 58° 35′ E. *Height above Mean Sea Level,* 15 *feet.*¶

CLIMATIC TABLE COMPILED FROM 7–38 YEARS' OBSERVATIONS, 1893 TO 1929, 1935 TO 1944.

Month	Pressure at M.S.L.	Air temperature Mean of				Relative humidity		Mean cloud amount (oktas)		Rain		Wind direction																		Mean wind speed		No. of days with wind speed 22 kt. or more	No. of days with fog
												0800 Percentage of observations from									1600 Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0800	1600	0800	1600	Average fall	No. of days with 0.1 in. or more	N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm				
	mb.	°F.	°F.	°F.	°F.	%	%			in.																				kt.			
January	1017	77	66	83	60	72	71	2·5	2·3	1·1	2	1	0	2	4	3	5	11	18	56	7	10	22	5	0	0	3	36	17	3		4	0
February	1015	77	67	84	61	73	73	2·3	2·1	0·7	1	2	0	2	2	1	4	17	20	52	4	7	20	2	1	0	2	42	22	3		1	0
March	1013	83	72	93	65	71	70	1·7	2·1	0·4	1	3	2	3	2	1	0	10	36	43	2	9	18	7	1	0	2	43	18	3		2	0
April	1009	90	78	100	71	64	68	0·8	1·6	0·4	0·8	6	0	3	4	0	1	7	40	39	3	11	18	7	0	0	0	35	26	3		1	0
May	1005	98	86	108	79	58	60	0·4	0·9	0·0	0	4	2	6	5	0	2	5	32	44	1	14	13	10	0	0	1	37	24	3		2	0
June	999	100	88	110	88	72	72	0·8	0·6	0·1	0·1	1	8	11	4	0	0	4	26	46	2	24	26	5	0	0	1	21	21	3		1	0
July	997	97	87	108	82	77	77	1·7	1·2	0·0	0·1	2	10	18	11	1	0	1	14	43	2	16	36	10	1	0	1	10	24	3		1	0·2
August	1000	92	84	103	79	82	80	1·5	0·7	0·0	0·1	2	6	25	10	1	0	2	9	45	3	11	45	15	1	0	0	3	22	3		1	0·8
September	1005	93	83	101	78	75	77	0·7	0·5	0·0	0	4	4	16	10	0	2	4	15	45	5	5	38	14	1	1	2	13	21	2		0	0
October	1011	93	80	100	74	69	74	0·1	0·6	0·1	0·3	4	1	6	7	1	4	7	30	40	2	6	32	7	4	0	2	24	23	2		0	0
November	1015	86	73	93	79	69	72	0·9	0·7	0·4	0·7	2	0	2	2	1	2	9	21	61	7	7	24	4	1	0	3	35	19	2		0	0
December	1017	79	68	86	63	70	71	1·7	1·7	0·7	2	1	1	2	0	2	3	13	15	63	8	5	22	1	1	0	6	36	21	3		2	0
Means	1009	89	78	111*	59**	71	72	1·3	1·2	—	—	3	3	8	5	1	2	7	23	48	4	10	26	7	1	0	2	28	22	3		—	—
Totals	—	—	—	—	—	—	—			3·9	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	1
Extreme values	—	—	—	116†	51††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		—	—
No. of Years' Observations	18	23	23	24	24	7	9	7	8	38	38	7	7	7	7	7	7	7	7	7	9	9	9	9	9	9	9	9	9	28		2–3	5

Standard of time : 60°E. meridian.

Authorities : MS. data supplied by India Met. Dept., Poona, India Weather Reviews.

¶Pressure, temperature and rain at 20 feet.

Meteorological Office, Air Ministry.

*Mean of highest each year.
**Mean of lowest each year.
†Highest recorded temperature.
††Lowest recorded temperature.

PLACE—PASNĪ. LAT. 25° 16′ N. LONG. 63° 27′ E. *Height above Mean Sea Level,* 10 *feet.*

CLIMATIC TABLE COMPILED FROM 6–30 YEARS' OBSERVATIONS, 1918 TO 1947.

Month	Pressure at M.S.L.	Air temperature Mean of				Relative humidity		Mean cloud amount (oktas)		Rain		Wind direction																		Mean wind speed		No. of days with wind speed 22 kt. or more	No. of days with fog at 0800
												0800									1530												
												Percentage of observations from									Percentage of observations from												
	Mean¶	Daily max.	Daily min.	Highest in each month	Lowest in each month	0800	1530	0800	1800	Average fall	No. of days with 0.4 in. or more	N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm				
	mb.	°F.	°F.	°F.	°F.	%	%			in.																				kt.			
January	1019	75	55	81	47	69	64	2·7	2·2	2·0	2	26	12	14	1	1	1	8	22	15	4	3	16	25	17	20	11	4	0	5		0	0
February	1016	77	56	86	45	75	62	2·6	1·9	1·4	2	14	7	14	3	0	1	11	28	22	3	1	11	14	23	27	16	4	1	5		1	0·9
March	1013	85	62	95	53	67	60	1·8	1·4	0·5	0·5	12	6	7	3	0	1	19	27	25	3	1	2	7	19	42	24	2	0	5		2	0·6
April	1010	90	68	100	61	69	59	1·8	1·7	0·4	0·5	7	4	4	5	2	4	38	29	7	1	1	0	3	17	50	28	0	0	6		2	0
May	1005	94	74	106	68	72	65	1·5	1·2	0·0	0·1	2	2	14	6	1	11	41	16	7	0	0	1	4	16	46	29	4	0	7		5	0
June	1000	94	78	104	73	75	70	2·9	1·8	0·3	0·2	1	2	18	12	3	14	33	12	5	0	0	1	6	19	49	24	1	0	6		4	0
July	999	91	78	98	74	80	73	5·8	4·2	0·5	1	0	0	13	17	8	18	25	8	11	0	0	1	10	31	45	12	1	0	5		3	0
August	1002	89	76	94	72	78	74	6·2	3·8	0·2	0·3	0	2	15	13	5	21	28	6	10	0	0	3	9	24	47	17	0	0	5		3	0
September	1007	90	72	100	67	78	71	3·7	1·1	0·0	0·1	4	1	15	7	3	9	32	17	12	0	0	1	3	19	55	22	0	0	6		2	0·2
October	1012	91	67	99	59	69	64	1·5	0·2	0·0	0·0	11	10	12	4	2	2	20	23	16	1	2	3	8	24	45	17	0	0	5		2	0·9
November	1016	85	60	93	51	63	61	1·4	0·9	0·1	0·2	18	11	4	0	0	1	11	32	23	3	1	4	18	28	36	9	1	0	4		1	0
December	1018	78	56	85	47	70	59	2·4	1·5	0·8	2	19	12	8	3	0	0	8	27	23	5	3	15	25	20	20	9	3	0	4		3	0·2
Means	1010	87	67	108*	44**	72	65	2·9	1·8	—	—	9	6	11	6	2	7	23	21	15	2	1	5	11	21	40	18	2	0	5		—	—
Totals	—	—	—	—	—	—	—			6·2	9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	28	3
Extreme values	—	—	—	115†	81††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Obversations	10	20	19	20	19†	10–11	6–9	10	6–7	30	18	←				8				→	←				7–9				→	20		2–3	5

Standard of time : 60° E. meridian.

Authorities : Poona, India Weather Reviews.

¶ Observations at 0800.

Meteorological Office, Air Ministry.

*Mean of highest each year.
**Mean of lowest each year.
†Highest recorded temperature.
††Lowest recorded temperature.

PLACE—CHĀHBAHĀR. LAT. 25° 17′ N. LONG. 60° 37′ E. *Height above Mean Sea Level, 25 feet.*

CLIMATIC TABLE COMPILED FROM 4–17 YEARS' OBSERVATIONS, 1928 to 1944.

Month	Pressure at M.S.L.	Air temperature Mean of				Relative humidity		Mean cloud amount (oktas)		Rain		Wind direction																		Mean wind speed		No. of days with wind speed 22 kt. or more	No. of days with fog
												0730									1530												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0730	1530	0730	1530	Average fall	No. of days with 0.1 in. or more	N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm				
	mb.	°F.	°F.	°F.	°F.	%	%			in.																				kt.			
January	1017	74	59	80	49	73	61	3·3	3·3	1·6	2	6	24	20	2	1	1	2	9	35	1	3	4	21	21	19	13	8	10	5		0	0·2
February	1014	76	62	82	53	76	63	2·7	2·5	0·8	1	5	12	12	2	2	1	9	19	38	2	2	3	10	18	31	21	6	7	5		1	0·4
March	1012	81	67	88	58	76	63	2·2	2·1	0·2	0·3	3	9	12	4	0	1	13	24	34	2	2	3	13	21	38	16	3	2	6		1	0·6
April	1009	87	72	94	66	77	68	1·8	1·7	0·1	0·4	4	5	7	3	0	1	13	24	43	0	4	0	7	25	39	14	3	8	5		1	0·2
May	1004	91	78	99	73	81	73	1·4	0·8	0·0	0	0	3	10	10	3	4	12	13	45	0	2	0	18	32	32	12	1	3	5		2	0·8
June	999	93	82	98	78	81	75	2·3	0·9	0·0	0·1	1	6	18	15	6	4	2	4	44	0	0	2	21	35	23	4	1	14	5		2	0·2
July	997	91	82	98	78	79	74	4·2	2·5	0·1	0·3	0	9	32	17	8	2	1	2	29	0	0	2	36	35	16	3	0	8	6		3	0
August	1000	88	79	93	75	79	74	4·6	2·0	0·0	0	1	7	34	22	6	2	1	1	26	0	0	4	42	35	13	1	0	5	7		1	0·2
September	1005	88	77	95	72	80	74	3·7	0·8	0·0	0	0	7	24	16	4	3	3	3	40	0	0	2	27	39	23	4	0	5	5		1	0·8
October	1011	88	73	96	66	81	70	1·6	0·6	0·0	0	2	9	12	4	2	1	4	12	54	0	1	0	8	26	42	14	0	9	4		0	4
November	1015	84	67	92	60	69	62	1·0	1·0	0·1	0·3	3	15	15	3	0	0	2	14	48	0	2	0	8	23	37	19	1	10	4		1	0·4
December	1017	78	62	84	54	67	58	2·4	2·4	1·0	1	6	20	19	3	0	0	2	9	41	3	6	3	7	16	32	14	4	15	4		2	0
Means	1008	85	72	103*	47**	77	68	2·6	1·7	—	—	3	10	18	8	3	2	5	11	40	1	2	2	18	27	29	11	2	8	5		—	—
Totals	—	—	—	—	—	—	—			3·9	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	8
Extreme Values	—	—	—	112†	41††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	15–17	←— 10–15 —→				←8–11→		←9–11→		←14–17→		←— 8–11 —→																		4–6		2–3	5

Standard of time : 52½°E. meridian.

Authorities : Poona, India Weather Reviews. *Meteorological Office, Air Ministry.*

*Mean of highest each year.
**Mean of lowest each year.
†Highest recorded temperature.
††Lowest recorded temperature.

PLACE—JĀSK. LAT. 25° 38′ N. LONG. 57° 46′ E. *Height above Mean Sea Level,* 13 *feet.*

CLIMATIC TABLES COMPILED FROM 9–48 YEARS' OBSERVATIONS, 1892 TO 1944.

Month	Pressure at M.S.L.	Air temperature Mean of				Relative humidity		Mean cloud amount (oktas)		Rain		Wind direction																		Mean wind speed		No. of days with wind speed 22 kt. or more	No. of days with fog
												0730									1530												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0730	1530	0730	1530	Average fall	No. of days with 0.1 in. or more	N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm				
	mb.	°F.	°F.	°F.	°F.	%	%			in.																				kt.			
January	1017	74	60	79	52	70	60	3·1	3·4	1·2	2	33	33	17	0	0	0	4	12	1	3	1	12	15	15	20	28	6	0	7		3	0
February	1015	75	62	81	55	74	63	2·9	2·6	1·0	2	18	35	15	0	0	1	10	20	1	1	1	9	10	11	29	33	6	0	7		4	0·4
March	1012	81	67	88	59	68	61	2·1	2·2	0·7	1	15	19	23	2	0	3	15	20	3	2	1	5	10	11	34	30	7	0	7		4	0·6
April	1009	87	73	94	66	67	63	1·5	2·0	0·2	0·5	8	12	23	2	0	3	23	22	7	0	1	1	8	11	42	32	5	0	7		2	0·8
May	1004	93	78	101	72	67	65	0·9	1·0	0·0	0·0	3	9	31	3	2	6	26	15	5	0	0	1	6	14	39	37	3	0	7		3	2
June	999	97	83	105	78	72	66	0·9	0·4	0·0	0·1	4	10	52	7	1	2	13	9	2	0	0	2	14	19	35	27	3	0	7		5	0·4
July	997	97	85	104	81	75	68	2·6	1·3	0·0	0·0	1	6	68	5	2	2	10	5	1	0	0	2	36	30	16	14	2	0	8		6	0·2
August	999	95	84	103	80	74	68	2·5	1·0	0·0	0·0	1	6	72	8	1	1	6	2	3	0	0	6	36	26	20	11	1	0	8		4	0·2
September	1005	93	81	101	76	71	66	1·8	0·4	0·0	0·0	5	10	62	5	1	1	2	6	8	0	0	1	27	23	24	21	4	0	7		4	0·2
October	1011	91	75	98	69	67	61	0·6	0·6	0·1	0·3	9	17	39	3	0	0	8	14	10	0	0	1	17	17	32	31	2	0	6		2	2
November	1015	84	68	90	62	63	60	1·1	1·4	0·3	0·6	26	36	15	2	1	0	3	11	6	0	0	2	10	20	35	26	4	1	5		2	0·2
December	1017	78	63	83	57	70	60	2·6	2·5	1·1	2	35	38	7	0	0	0	7	11	2	2	2	5	10	19	26	31	4	1	6		2	0
Means	1008	87	73	106*	51**	70	63	1·9	1·6	—	—	13	19	35	3	1	2	11	12	4	1	0	4	17	18	29	27	4	0	7		—	—
Totals	—	—	—	—	—	—	—			4·6	9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	41	7
Extreme Values	—	—	—	113†	42††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	40	←	38		→	←9	11→	←1	0→	48	38	←								10	11									→		2–3	5

Standard of time : 52½°E. meridian.

Authorities : MS. data supplied by India Met. Dept.,
Poona, India Weather Reviews.

Meteorological Office, Air Ministry.

*Mean of highest each year.
**Mean of lowest each year.
†Highest recorded temperature.
††Lowest recorded temperature.

PLACE—BANDAR ʻABBĀS. LAT. 27° 11′ N. LONG. 56° 17′ E. *Height above Mean Sea Level, 29 feet.*

CLIMATIC TABLE COMPILED FROM 6–10 YEARS' OBSERVATIONS, 1938 TO 1947.

Month	Pressure at M.S.L.	Air temperature Mean of				Relative humidity		Mean cloud amount (oktas)		Rain		Wind direction																		Mean wind speed			
												0730									1530												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0730	1530	0730	1530	Average fall	No. of days with 0.1 in. or more	N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm				
	mb.	°F.	°F.	°F.	°F.	%	%			in.																				kt.			
January	1017	74	56	80	48	73	63	2·2	2·2	2·4	2	27	34	2	0	1	1	3	28	9	0	6	6	17	37	22	5	3	4	5			
February	1015	75	59	81	51	75	64	1·9	1·8	1·3	2	21	34	4	2	2	1	8	19	9	0	4	2	22	48	19	1	1	3	5			
March	1013	81	64	89	56	69	60	1·8	1·7	0·3	0·8	15	41	4	1	1	5	11	13	9	0	5	4	19	46	25	1	0	0	6			
April	1010	89	70	98	63	67	59	1·3	1·5	0·3	0·4	7	44	7	2	3	4	5	7	21	1	0	0	17	58	21	3	0	0	6			
May	1005	97	76	104	71	66	57	0·7	0·6	0·1	0·1	8	32	7	6	4	3	6	5	29	0	0	0	13	54	31	2	0	0	6			
June	999	101	81	110	76	68	58	1·1	0·1	0·0	0	6	28	11	5	3	3	6	8	30	0	0	1	20	54	24	1	0	0	6			
July	997	100	85	110	80	72	63	2·2	0·9	0·0	0	4	21	17	15	7	6	8	3	24	0	0	0	35	52	12	1	0	0	5			
August	999	100	84	108	80	70	65	1·5	0·6	0·0	0	6	19	17	12	3	1	4	9	29	0	0	1	38	50	9	1	1	0	5			
September	1005	98	81	106	76	76	70	1·0	0·2	0·0	0·1	10	42	14	6	2	0	2	6	18	0	0	1	33	58	13	0	0	0	6			
October	1012	95	75	101	67	75	67	0·7	0·3	0·0	0·1	11	49	8	3	3	2	3	10	11	2	0	0	15	67	15	1	0	0	5			
November	1015	87	66	95	59	67	62	1·0	1·1	0·1	0·1	21	49	3	0	0	0	1	16	10	2	2	3	14	61	15	2	0	1	5			
December	1018	77	58	84	50	70	68	2·0	2·0	1·6	2	26	28	3	0	0	0	3	38	7	1	3	6	19	50	15	2	3	1	5			
Means	1009	89	71	112*	46**	71	63	1·5	1·1	—	—	14	35	8	4	2	2	5	13	17	0	2	2	22	52	18	2	1	1	5			
Totals	—	—	—	—	—	—	—			6·1	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Extreme Values	—	—	—	119†	38††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	←——7–10——→									←8	10→	←——6–8——→																					

Standard of time: 52½° E. meridian.

Meteorological Office, Air Ministry.

Authorities: Poona, India Weather Reviews.

*Mean of highest each year.
**Mean of lowest each year.
†Highest recorded temperature.
††Lowest recorded temperature.

PLACE—BUSHIRE. LAT. 28° 59′ N. LONG. 50° 50′ E. *Height above Mean Sea Level,* 14 *feet.*

CLIMATIC TABLE COMPILED FROM 8-53 YEARS' OBSERVATIONS, 1876 TO 1943.

Month	Pressure at M.S.L.	Air temperature Mean of				Relative humidity		Mean cloud amount (oktas)		Rain		Wind direction																		Mean wind speed		No. of days with wind speed 22 kt. or more	No. of days with fog
												0730									0730												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0730	1530	0730	1530	Average fall	No. of days with 0.1 in. or more	N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm				
	mb.	°F.	°F.	°F.	°F.	%	%			in.																				kt.			
January	1018	64	51	74	43	82	78	2·4	2·2	2·9	5	25	26	17	12	3	2	0	6	9	15	5	1	11	10	5	5	48	0	6		3	0
February	1015	65	53	76	45	82	76	2·4	2·5	1·8	3	23	21	11	10	5	3	1	9	17	10	3	2	6	14	5	9	50	1	6		4	1
March	1014	73	59	87	51	76	71	1·9	2·1	0·8	2	28	21	17	8	3	0	2	9	12	4	2	0	5	9	8	20	52	0	7		2	0
April	1011	81	67	95	59	72	72	1·4	1·3	0·4	1	25	16	12	12	5	2	5	15	8	5	0	0	3	11	11	29	41	0	6		4	0
May	1006	89	76	100	67	73	74	0·6	0·7	0·0	0	27	15	8	6	4	2	6	26	6	3	2	0	1	1	10	35	46	2	6		3	0·2
June	1000	92	81	101	74	74	72	0·1	0·0	0·0	0	27	9	5	6	4	5	6	35	3	6	0	0	0	1	10	43	39	1	8		9	0·2
July	996	95	84	102	78	75	73	0·3	0·2	0·0	0	20	9	6	7	8	5	6	29	10	2	0	0	0	5	16	48	29	0	6		7	1
August	998	97	84	104	78	72	71	0·5	0·2	0·0	0	17	14	17	16	5	2	3	15	11	2	0	0	0	5	18	42	33	0	5		2	0·2
September	1004	94	79	100	73	71	69	0·3	0·1	0·0	0	20	15	17	16	4	3	5	8	12	3	0	1	0	3	12	42	39	0	4		2	0·2
October	1011	88	72	94	65	68	68	0·4	0·6	0·1	0·2	19	25	17	11	3	4	3	10	8	4	0	0	0	2	8	37	48	1	4		1	0·2
November	1015	78	63	87	54	74	71	1·8	1·9	1·6	3	18	28	27	17	2	0	1	4	3	10	3	3	6	6	7	17	47	1	5		2	0·2
December	1018	68	55	78	46	82	77	2·8	2·7	3·2	4	25	29	23	13	1	0	0	3	6	18	2	4	7	9	2	7	50	1	5		2	0·6
Means	1009	82	69	106*	42**	75	73	1·2	1·2	—	—	23	19	15	11	4	2	3	14	9	7	1	1	3	6	9	28	44	1	6		—	—
Totals	—	—	—	—	—	—	—			10·8	18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	41	4
Extreme Values	—	—	—	115†	32††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	10	← 53 →				← 8-9 →				← 53 →		← 8-9 →																		43		2-3	5

Standard of time : 52½E. meridian.

Authorities : MS. data supplied by India Met. Dept.
Poona, India Weather Reviews.

Meteorological Office, Air Ministry.

*Mean of highest each year.
**Mean of lowest each year.
†Highest recorded temperature.
††Lowest recorded temperature.

PLACE—SHĀRJAH. LAT. 25° 20′ N. LONG. 55° 21′ E. *Height above Mean Sea Level,* 18 *feet.*

CLIMATIC TABLE COMPILED FROM 4–13 YEARS' OBSERVATIONS, 1933 TO 1954.

Month	Pressure at M.S.L.	Air temperature Mean of				Relative humidity		Sky‡ No. of days		Rain		Wind direction																		Mean wind speed		No. of days with wind‡ speed 34 kt. or more	No. of days with fog‡
												0730									1530												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0730	1530	Clear ø < 2 oktas	Cloudy ø > 6 oktas	Average fall	No. of days with 0.1 in. or more	N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm				
	mb.	°F.	°F.	°F.	°F.	%	%			in.																				kt.			
January	1017	74	54	81	46	81	61	16	2	0·9	2	0	2	14	43	20	2	8	5	6	14	4	0	1	1	7	37	36	0	6		0·2	1
February	1015	75	57	85	50	81	63	10	2	0·9	2	1	4	11	35	25	2	12	5	5	16	3	2	0	2	6	42	29	0	7		0·4	3
March	1013	80	60	97	51	74	61	10	3	0·4	0·7	1	4	7	27	25	5	10	4	17	18	4	0	1	1	5	36	35	0	7		0	3
April	1010	86	65	100	56	66	63	14	1	0·2	0·3	2	4	5	17	34	9	6	2	21	12	2	0	0	0	5	42	39	0	6		0	2
May	1005	93	72	103	65	61	63	20	0·4	0·0	0	0	1	2	12	48	15	4	1	17	6	0	0	0	0	4	52	38	0	6		0	2
June	999	97	77	107	70	64	65	25	0·5	0·0	0	0	2	4	14	49	13	1	1	16	7	1	0	0	0	6	43	43	0	6		0	2
July	997	100	82	111	75	64	64	17	0·5	0·0	0	0	2	11	18	36	13	1	1	18	19	1	2	0	0	3	27	48	0	6		0	0·7
August	999	103	82	112	76	66	64	19	0.0	0·0	0	0	3	13	32	32	4	1	1	14	26	1	1	0	0	1	16	55	0	6		0·3	1
September	1004	99	77	108	72	73	64	24	0	0·0	0	1	1	10	37	29	2	0	0	20	15	1	0	0	0	1	16	67	0	5		0	1
October	1011	92	71	100	66	62	62	29	0	0·0	0	0	1	10	40	31	1	1	0	16	9	0	0	0	0	1	30	60	0	5		0	1
November	1015	87	64	93	58	78	59	19	0.6	0·4	0·2	1	2	16	47	22	1	1	1	9	15	1	1	1	0	1	28	53	0	5		0	2
December	1017	78	58	85	52	82	62	10	2	1·4	2	0	5	16	39	18	1	5	3	13	17	4	1	1	1	7	31	37	1	5		0	0·4
Means	1008	89	68	113 *	45**	72	63	—	—	—	—	0	3	10	30	31	6	4	2	14	15	2	1	0	0	4	33	45	0	6		—	—
Totals	—	—	—	—	—	—	—	213	12	4·2	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·9	19
Extreme Values	—	—	—	118†	37††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		—	—
No. of Years' Observations	←		11–13		→	←10	12→	←4	5→	←12	13→	←								10	12									→		←4	5→

Authorities : India Weather Reviews.
MS. data in M.O.

‡At 25° 21′N. 55° 23′E. Ht. 8ft.
øMean of obs. at 0630, 1230, 1830.
*Mean of highest each year.
**Mean of lowest each year.
†Highest recorded temperature.
††Lowest recorded temperature.

Standard of time : 52½°E. meridian.

Meteorological Office, Air Ministry.

PLACE—BAHREIN (MUHARRAQ). LAT. 26° 16′ N. LONG. 50° 37′ E. *Height above Mean Sea Level, 7 feet.*

CLIMATIC TABLE COMPILED FROM 5–8 YEARS' OBSERVATIONS, 1947 TO 1954.

Month	Pressure at M.S.L.	Air temperature Mean of				Relative humidity		Sky No. of days		Rain		Wind direction																		Mean wind speed		No. of days with wind speed 34 kt. or more	No. of days with fog
												0700									1600												
												Percentage of observations from									Percentage of observations from												
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0700	1600	Clear < 2 oktas	Cloudy > 6 oktas	Average fall	No. of days with 0.1 in. or from	N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm	0700	1600		
	mb.	°F.	°F.	°F.	°F.	%	%			in.																				kt.			
January	1018	69	59	77	51	82	65	14	2	0·2	1	13	2	2	9	14	4	23	24	9	17	3	5	12	12	2	11	37	1	9	11	0	1
February	1017	69	60	79	52	80	63	11	3	0·8	3	20	1	5	12	4	2	13	35	8	32	5	6	8	9	1	4	34	1	10	12	0	1
March	1014	75	64	87	57	77	58	10	4	0·5	2	34	9	5	8	4	3	16	14	7	47	8	17	3	3	0	2	19	1	11	13	0·1	0·6
April	1011	84	71	98	64	76	51	14	2	0·1	0·9	25	4	7	7	7	9	16	14	11	43	19	14	5	4	1	0	13	1	9	12	0	0·5
May	1006	91	79	100	73	72	53	19	1	0·1	0·5	20	4	3	3	3	4	30	27	6	50	11	11	1	1	0	0	26	0	9	13	0	1
June	1001	95	85	103	80	67	52	29	0	0·0	0	18	0	0	1	1	6	27	42	5	46	8	1	0	0	0	0	45	0	11	14	0	3
July	997	99	87	105	82	70	52	24	0·1	0·0	0	7	1	1	4	3	4	39	33	8	48	20	6	1	0	0	3	22	0	8	13	0	4
August	999	99	88	105	83	74	56	28	0·1	0·0	0	8	2	4	3	4	6	35	26	12	56	16	11	1	0	0	1	15	0	7	12	0	1
September	1005	96	84	102	80	77	55	29	0	0·0	0	11	1	2	3	3	5	32	28	15	65	13	7	1	1	0	0	13	0	7	11	0	1
October	1012	90	78	97	72	81	57	29	0	0·0	0	14	3	0	3	5	9	32	18	16	61	12	11	0	1	0	1	14	0	6	10	0	1
November	1016	81	71	88	64	80	61	19	1	0·1	0·7	11	1	4	2	9	7	28	24	14	47	3	4	2	6	0	4	33	1	7	10	0	0·6
December	1019	71	63	79	54	82	67	11	5	1·1	3	8	2	2	7	8	2	35	27	9	18	3	3	8	6	2	10	49	1	9	10	0	1
Means	1010	85	74	107*	49††	77	57	—	—	—	—	16	3	3	5	5	5	27	26	10	44	10	8	3	4	0	3	27	1	9	12	—	—
Totals	—	—	—	—	—	—	—	237	18	2·9	11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·1	16
Extreme Values	—	—	—	110†	44††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years' Observations	6–8	←			7–8						→	←										5–6									→	←7–	8→

Standard of time: 60°E. meridian.

Meteorological Office, Air Ministry.

Authorities: MS. returns in M.O.

*Mean of highest each year.
**Mean of lowest each year.
†Highest recorded temperature.
††Lowest recorded temperature.

PLACE—BASRA (MA‘QIL AIRPORT). LAT. 30° 34′ N. LONG. 47° 47′ E. *Height above Mean Sea Level, 8 feet.*

CLIMATIC TABLE COMPILED FROM 4–11 YEARS’ OBSERVATIONS, 1937 TO 1947.

Month	Pressure at M.S.L.	Air temperature Mean of				Relative humidity		Sky¶ No. of days		Rain		Wind direction																		Mean wind speed		No. of days with§ wind speed over 22 kt.	No. of days with fog§
												0500									1600												
												Percentage of observations from									Percentage of observations from												
	Mean¶	Daily max.	Daily min.	Highest in each month	Lowest in each month	0500	1600	Clear < 2 oktas	Cloudy > 6 oktas	Aver-age fall	No. of days with 0·04 in. or more	N	NE	E	SE	S	SW	W	NW	Calm	N	NE	E	SE	S	SW	W	NW	Calm	0500	1600		
	mb.	°F.	°F.	°F.	°F.	%	%			in.																				kt.	kt.		
January	1019	64	45	76	36	89	62	11	5	1·4	5	9	6	13	9	7	6	24	17	9	7	3	9	14	5	1	28	28	5	5	8	1	3
February	1017	68	48	80	39	87	55	13	4	1·1	4	9	8	14	6	7	5	24	17	10	10	2	10	12	4	1	26	32	3	5	9	2	2
March	1015	75	55	85	43	81	49	13	4	1·2	3	8	9	13	9	7	7	17	17	13	12	2	8	13	7	1	19	34	4	5	10	2	1
April	1012	85	63	102	55	76	43	11	5	1·2	3	10	8	9	8	7	5	17	17	19	18	5	9	13	1	0	15	36	3	5	9	1	1
May	1007	96	76	105	68	65	40	19	2	0·2	0·7	14	6	3	4	6	8	22	24	13	14	3	4	2	1	0	26	47	3	5	8	0·4	2
June	1002	100	81	107	75	60	41	29	0	0·0	0	7	2	1	0	2	5	38	39	6	6	0	0	1	0	0	37	54	2	7	6	0·7	2
July	998	104	81	112	77	58	35	25	0·5	0·0	0·1	6	1	2	1	1	6	50	25	8	10	0	1	2	0	0	42	44	1	6	9	0	3
August	999	105	78	113	70	56	32	27	0·2	0·0	0	3	1	1	3	3	6	46	29	8	8	0	3	1	0	0	35	51	2	5	8	0·3	2
September	1006	102	72	109	63	62	32	28	0	0·0	0	6	2	6	1	5	7	36	26	11	12	0	3	2	1	0	22	55	5	5	6	0	2
October	1013	94	64	102	51	67	36	22	1	0·0	0	9	3	7	5	11	8	30	17	10	11	4	10	7	4	2	22	35	5	5	7	0	2
November	1017	80	57	93	43	83	52	12	4	1·4	2	15	7	9	8	6	8	25	16	6	10	7	12	10	2	1	23	28	7	4	4	0·3	2
December	1019	69	48	76	35	89	62	11	5	0·8	3	8	6	16	6	3	3	30	17	11	7	4	10	9	3	0	29	28	10	4	6	0·2	3
Means	1010	87	64	115*	32**	73	45			—	—	9	5	8	5	5	6	30	22	10	10	3	7	7	2	1	27	39	4	5	7	—	—
Totals	—	—	—	—	—	—	—	221	31	7·3	21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	25
Extreme Values	—	—	—	120†	24††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of Years’ Observations’	←10–11		→	←4–5	→	←10–11																											→

Authorities : Government of Iraq. Met. Service, Climatological Means for Iraq., Baghdad 1950.

Standard of time : 45°E. meridian.

Meteorological Office, Air Ministry.

¶Observations at 0500, 0900, 1600.
*Mean of highest each year.
**Mean of lowest each year.
†Highest recorded temperature.
††Lowest recorded temperature.
§Includes days when dust reduces visibility below ½ n-mile.

CHAPTER II

APPROACHES TO THE PERSIAN GULF FROM SOUTHWARD—COASTS OF 'OMĀN, AL BĀTINA, AND ASH SHUMAILĪYA—RAS AL HADD TO DIBBA.

Chart 2851.

COAST OF 'OMĀN.—Ras al Hadd.—This cape, the southernmost point at the entrance of the Gulf of 'Omān, is not easily identified for it is low and sandy as is the coast for about 3 miles southward and 2 miles westward of it. Farther southward, for a distance of about 4 miles, or as far as Ras al Junaiz (*see* Red Sea, and Gulf of Aden Pilot), and farther westward for about 12 miles, or as far as Sūr, the coast of 'Omān is composed of low cliffs. *See* view facing page 38.

Chart 3518, plan of Khōr al Hajr.

Al Hadd (*Lat. 22° 30′ N., Long. 59° 48′ E.*) is a village, consisting chiefly of mat huts standing round a fort with three round towers, situated about one mile south-westward of the extremity of the cape, and in the vicinity are some date trees. Another round tower, which, in 1928, was partly in ruins, stands detached on the northern shore of Khōr al Hajr, westward of the town.

Chart 2851

A bank, over which there are depths of less than 20 fathoms ($36^{m}6$), extends about one mile offshore between Ras al Junaiz and Ras al Hadd; this bank is notable for the large fish caught over it. Northward of Ras al Hadd there are considerable depths about half a mile offshore. Ras ash Shajar is situated about 40 miles north-westward of Ras al Hadd, and there is no known off-lying danger between them.

Currents.—For the currents in the Gulf of 'Omān, *see* page 9, and for those off the south-eastern coast of Arabia, *see* Red Sea and Gulf of Aden Pilot. Off Ras al Hadd, the currents are strong, variable, and much influenced by the prevailing winds.

Usually, from April to September, the current sets northward along and parallel with the coast from Ras al Madraka (Red Sea and Gulf of Aden Pilot) to Ras al Hadd, at rates up to about 2 knots. Sometimes, generally towards the end of the south-west monsoon, while the current sets northward along the coast southward of Ras al Hadd, it sets south-eastward and eastward along the coast west-north-westward of Ras al Hadd. Off that point the two currents combine and turn north-eastward at a rate of about 2 knots. The rate of this combined current is increased by the east-going tidal stream along the south-western shore of the Gulf of 'Omān. Owing to this current, vessels lying-to at night off Ras al Hadd have been out of sight of land at daylight.

Charts 38, 1012, 748b.

Charts 3518, plans of Khōr al Hajr and Khōr al Jarāma, 2851.

Anchorages.—Anchorage may be obtained, in depths of from 8 to 10 fathoms ($14^{m}6$ to $18^{m}3$), coral, from 5 to 8 cables offshore, with the village of Al Hadd bearing about 270°, but it is exposed, and the depths decrease rapidly within 10 fathoms ($18^{m}3$).

During the South-west monsoon, better anchorage may be obtained, in a depth of about 12 fathoms ($21^{m}9$), about a quarter of a mile offshore, between the entrances of Khōr al Hajr and Khōr al Jarāma, situated, respectively, about 2½ and 4 miles westward of Ras al Hadd; or off the entrance of the latter in depths of from 10 to 12 fathoms ($18^{m}3$ to $21^{m}9$), mud and sand, about half a mile offshore.

Chart 2851.

When at anchor off the coast, anywhere between Ras al Hadd (*Lat. 22° 30′ N., Long. 59° 48′ E.*) and Sūr, a vessel must always be prepared for a sudden shift of wind northward.

Chart 3518, plan of Khōr al Hajr.

Khōr al Hajr.—Tidal streams.—This small inlet affords shelter to fishing boats, but it is exposed to northerly winds, which at times blow strongly, and the holding ground is reported to be bad. Within the entrance, which lies between two low cliffs and is about 1¾ cables wide, it trends southward for about half a mile and thence eastward for about one mile, extending to a position close westward of Al Hadd. The depths in the entrance are from 5 to 3½ fathoms ($9^{m}1$ to $6^{m}4$), but within it soon shoals to 1½ fathoms ($2^{m}7$) and its inner and larger part dries. The entrance is between Ras al Haiya and Ras al Hamma, between which Jabal Sifān may be seen in the background; *see* view facing page 39.

The tidal streams near the entrance of Khōr al Hajr set eastward on the falling tide and westward on the rising tide; the east-going stream is weak, but the west-going stream attains a maximum rate of about 1½ knots.

Chart 3518, plan of Khōr al Jarāma.

Khōr al Jarāma.—Beacon.—This khōr is a shallow inlet, entered through a tortuous channel between cliffs about 60 feet ($18^{m}3$) high.

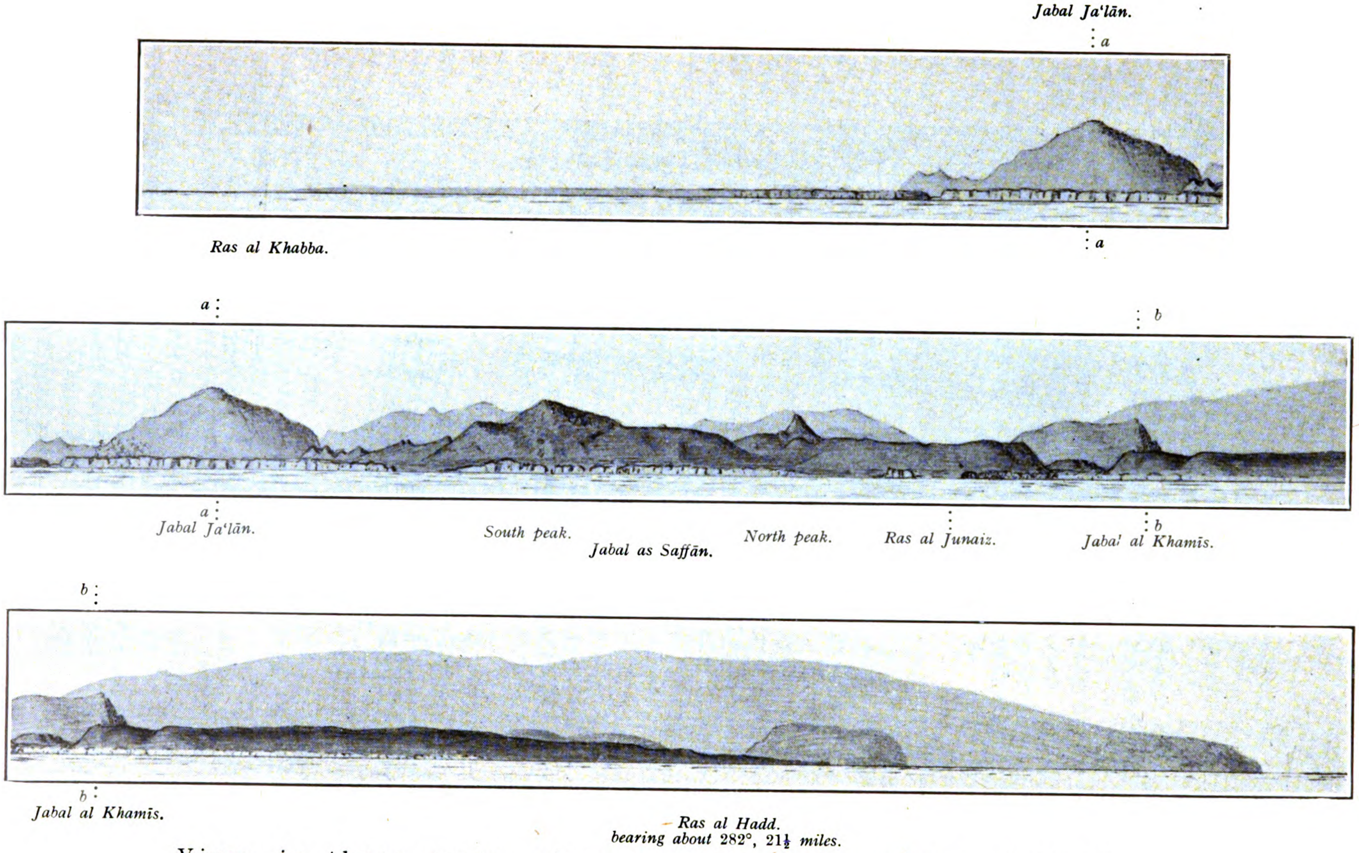
A white cairn stands, at an elevation of 70 feet ($21^{m}3$), on Ras Bu Būraij, the entrance point of the khōr; it is reported to be a good landmark. Close southward of the point, portions of the cliff have fallen and, lying near its foot, are covered at high water.

At the southern end of the entrance channel lies an islet, beyond which the khōr expands into a large and shallow basin, surrounded for the most part by cliffs from 100 to 200 feet ($30^{m}5$ to $61^{m}0$) high, but having at its southern end a low sandy beach, close off which is an isolated black flat-topped hill which is a prominent feature; on the beach are a few scattered trees. A square stone building stands on the south-eastern side of the islet (*Lat. 22° 29′ N. Long. 59° 44′ E.*).

The khōr affords excellent shelter, and though the turnings in the entrance channel are somewhat sharp it is accessible to steam vessels with a draught of less than 15 feet ($4^{m}6$). The inlet is used by native vessels only as a harbour of refuge; there is no village on its shores. There is an abundance of fish in the khōr and the seine may be hauled to advantage on its beaches.

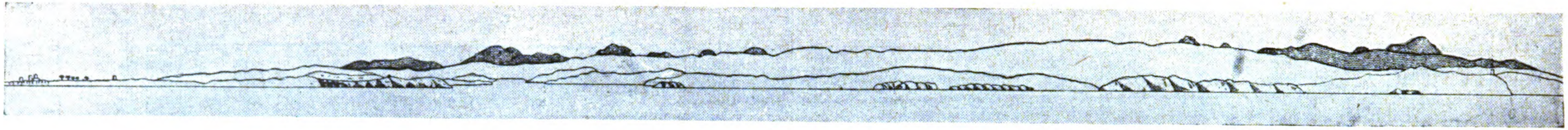
About a quarter of a mile within the entrance, a bank, with a depth of 7 feet ($2^{m}1$), extends from the western shore, leaving between it and the eastern shore a channel about 60 yards ($54^{m}9$), wide, in which the

To face page 38.


Jabal Ja'lān.
a
Ras al Khabba.
a
a
b
a
Jabal Ja'lān.
South peak.
Jabal as Saffān.
North peak.
Ras al Junaiz.
b
Jabal al Khamīs.
b
b
Jabal al Khamīs.
Ras al Hadd.
bearing about 282°, 21½ miles.

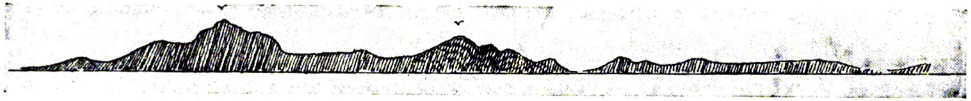
View, in three parts, of eastern approach to Ras al Hadd.

(*Original dated* 1909.)

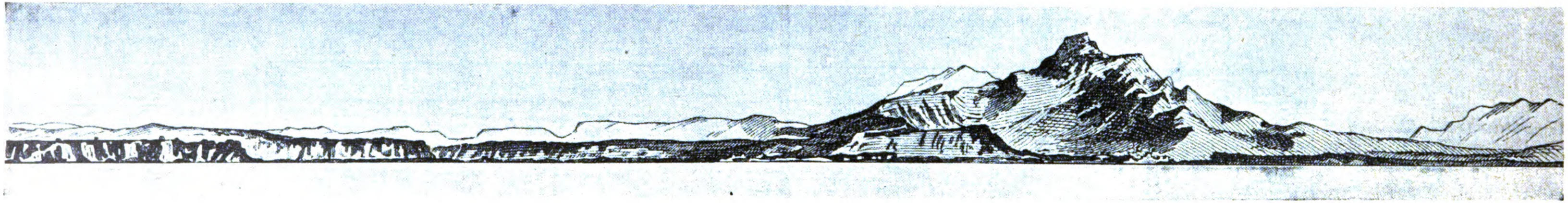

Jabal Sifān,
bearing 164°.
Ras al Hamma.
Ras al Haiya.
Khōr al Hajr.
Cairn.
Ras Bu Būraij.
Khōr al Jarāma.

Coast between Ras al Hadd and Khōr al Jarāma from northward.

(*Original dated* 1906.)


Jabal Ja'lan.
Khōr al Jarāma.
Jabal al Khamīs,
bearing 238°, 36 miles.
Jabal Kalhāt.
Sūr.

(*Original dated* 1908.)


Towers at 'Aiqa.
Muqraimatain.
Fort Sanaisala.
Fort.
Jabal al Khamīs,
bearing 198°, 12 miles.

Two views of approaches to Sūr.

(*Original dated* 1906.)

Chart 3518, plan of Khōr al Jarāma.

least depth is 21 feet ($6^{m}4$). Southward of this shoal, and through the channel eastward of the islet at the southern end of the entrance channel, a depth of 24 feet ($7^{m}3$) can be carried to the anchorage situated close southward of the islet.

Anchorage.—Directions.—Good well-sheltered anchorage may be obtained, in depths of from 3 to 4 fathoms ($5^{m}5$ to $7^{m}3$), between 2 cables southward and about half a mile south-westward of the islet at the southern end of the entrance channel.

In 1935, H.M.S. *Fowey* anchored, in a depth of 9½ fathoms ($17^{m}4$), off the entrance to the khōr with the cairn on Ras Bu Būraij bearing 139°, distant 2·8 cables.

In 1935, H.M.S. *Shoreham* entered the khōr on the first of the out-going tidal stream and left on the first of the in-going stream. Little difficulty was experienced, although it was necessary to reverse the inner propeller when negotiating the sharp turn. Good anchorage was obtained with the cairn on Ras Bu Būraij (*Lat. 22° 30′ N., Long. 59° 44′ E.*), bearing 012°, distant 12½ cables.

A vessel entering the khōr is advised to do so at the very first of the out-going tidal stream, as at other times the eddies in the bends of the channel render steering very difficult. The tidal streams setting through the entrance attain a rate of about 2 knots, and in the channel winds are unreliable and often gusty.

The isolated flat-topped hill on the southern side of the khōr, bearing 176°, leads to the entrance. A vessel entering should give Ras Bu Būraij a sufficient berth to avoid the fallen portions of the cliff, and should afterwards keep close to the eastern shore until past the shoal about a quarter of a mile within the entrance; thence she should keep in mid-channel and, passing north-eastward of the islet at its southern end, should anchor in the area mentioned above.

Climate.—In February, 1935, H.M.S. *Shoreham* reported that the climate at Khōr al Jarāma, during the South-west monsoon, was far better than within the Persian gulf. A monsoon breeze blew almost constantly, while temperature and humidity were moderate and the nights were cool.

Chart 2851.

Coast.—The coast between the entrance of Khōr al Jarāma and Ras Sharh about 4½ miles westward, is bordered by cliffs; thence to Sūr, 6 miles farther westward, there is a ridge of low broken hills with cliffs in places.

Chart 3518, plan of Sūr anchorage.

Sūr.—Sūr is the name usually given to a group of settlements at the mouth of the Wādi Falaij, which latter enters the sea, forming a narrow creek which affords shelter to small craft. On account of its abundant fertility, it stands out in marked contrast to the surrounding desert.

Hisār Sanaisala, a large square light-coloured building with a round tower at each corner, is situated 6 cables inland about 2 miles west-north-westward of the mouth of the creek and is visible from seaward from a distance of about 10 miles. This fort and another, standing on higher ground about 1½ miles west-south-westward, are surrounded by villages of considerable size. There are numerous towers in this vicinity, some of which are good marks.

Chart 3518, plan of Sūr anchorage, 2851.

Jabal Khamīs, about 2,900 feet ($883^{m}9$) high, situated about 11 miles

Chart 3518, plan of Sūr anchorage.

south-south-westward of Ras Jimeleh, the **western entrance point,** bearing 212°, leads to the anchorage off Sūr. Jabal Ja'lān (*see* Red Sea and Gulf of Aden Pilot) rises to an elevation of about 4,050 feet ($1234^{m}4$), about 15½ miles south-south-westward of Jabal Khamīs, and shows up well when seen clear of that mountain. *See* views facing page 39, and on chart 38.

Chart 3518, plan of Sūr anchorage.

The creek at Sūr is extensive but dries almost entirely; the depth on the bar at the entrance is about one foot ($0^{m}3$).

Muqraimatain, the largest settlement, is situated on the western side, and 'Aiqa, on the eastern side, of the mouth of the inlet. The houses in both quarters are mostly of mud and stone.

The country inland is partly cultivated and there are numerous date groves.

There is a suitable landing place on the southern side of Ras Jimeleh near the observation spot. At high water, a vessel's motor boat can proceed alongside a protecting ledge of rock, but at low water it is necessary to land in a small boat. The Custom house, which is a low, white, conspicuous building, is situated on the sandy point southward of West Sūr.

Anchorage.—Anchorage may be obtained off Sūr, in depths of 8 fathoms ($14^{m}6$) sand, the entrance to the creek, with the eastern entrance point of the inlet bearing 178°, distant 6 cables. It is unadvisable to anchor closer in, as a heavy swell may arise very quickly.

Chart 2851.

Coast.—Anchorages.—The coast between Ras Jimeleh and Ras ash Shajar, about 28 miles north-westward, is bordered mostly by low cliffs; about 3 miles from Ras Jimeleh, the land rises to the precipitous Jabal Bani Jābir, of which Jabal Kalhāt is the south-eastern end. The outline of these mountains is regular and they are about 4,400 feet ($1341^{m}1$) high; behind them is a higher range, about 6,500 feet ($1981^{m}2$) high. North-westward of Ras ash Shajar the coastal mountains recede inland and end at the Devil's gap, *see* page 41.

Kalhāt, a small village, situated at the entrance of a gorge about 11 miles north-westward of Ras Jimeleh, may usually be identified by a peak in the coastal range about one mile south-eastward of it (*see* view facing page 44). It is reported that small craft can obtain shelter from northerly winds very close inshore under a small projecting point. There is a prominent tower in the village and two smaller ones. Landing may be effected on a shingle beach about half a mile southward of a tower standing on a spit (*Lat. 22° 42′ N., Long. 59° 17′ E.*).

Anchorage was obtained by H.M.S. *Cyclamen*, in 1925, off the southern side of the spit, in a depth of 17 fathoms ($31^{m}1$), about 3½ cables offshore, eastward of the village. From this position, the depths rapidly increase seaward to over 40 fathoms ($73^{m}2$) and shoal as rapidly towards the coast. The vicinity of the spit should be avoided as foul ground appears to extend some distance from it.

Anchorage may be obtained off Haiwa, about 6½ miles north-westward of Kalhāt, but it is uninhabited.

Tiwi, situated about 4½ miles north-north-westward of Haiwa is a large village with a date grove about 2 cables inland. It is situated at the entrance of a gorge and may thus easily be mistaken for Kalhāt.

Charts 38, 2858, 748b.

Chart 2851.

In 1884, H.M.S. *Dragon* anchored close to the beach northward of a small spit, in a depth of 9 fathoms ($16^{m}5$). There are depths of 100 fathoms ($182^{m}9$) about 2½ cables offshore abreast Tiwi.

Shāb, about 1½ miles north-westward of Tiwi, is a small village with a tower standing on a low hill at the mouth of a deep gorge in the mountains. Anchorage may be obtained off this village, in depths of from 20 to 30 fathoms ($36^{m}6$ to $54^{m}9$) from 3 to 4 cables offshore, but vessels should be prepared to leave it on the approach of a shamāl.

Makalla Wabār, situated between Shāb and Ras ash Shajar (*Lat. 22° 56′ N., Long. 59° 12′ E.*), is an anchorage where small craft may obtain shelter from the shamāl. Fins is a small village between Makalla Wabār and Ras ash Shajar. The latter point is low, sandy and well defined only when close-to, but a solitary tree, about half a mile southward of it, is a good mark. For a distance of about 3½ miles on either side of the cape, the mountains recede from the coast. During a shamāl, native craft anchor, very close in, south-eastward of the cape.

Danger.—A shoal bank extends about three-quarters of a mile offshore from Ras ash Shajar. A vessel has anchored on this bank, in a depth of about 5¾ fathoms ($10^{m}5$), rock and sand, about 4 cables offshore, with Ras ash Shajar bearing 308° and a tower in Fins, situated about 1½ miles southward, bearing 175°.

Coast.—For about 18 miles north-westward of Ras ash Shajar, the coast is bordered by low cliffs, thence it becomes low and sandy to within 2 miles southward of Ras Abu Dāud, situated about 28 miles north-westward of Ras ash Shajar, where it is rocky. About 10 miles north-westward of Ras ash Shajar, Jabal Bani Jābir (page 40) recedes from the coast in a west-north-westerly direction and terminates abruptly in a large bluff about 12 miles inland on the southern side of Devil's gap. The north-western side of the gap is formed by the south-eastern end of a range of mountains, extending in a north-westerly direction, which presents an even crest except near its south-eastern end, where Jabal Quraiyāt, a small peak, rises to an elevation of 6,230 feet ($1898^{m}9$); this range terminates north-westward and south-eastward in bluffs, that at the south-eastern end falling in steps. The Devil's gap is the great valley which trends south-westward between these two mountain ranges; when bearing between 216° and 285° it is prominent, but when bearing about 250° it is quite open and very remarkable (*see* view on chart 38). Sometimes, when the mountain tops on either side of the gap are enveloped in continuous clouds of a heavy stratus formation, a clear sky beyond may be seen through the gap; in the evening, this presents a remarkable spectacle. There are very heavy squalls occasionally through this valley in winter.

Jabal Abu Dāud is a detached mountain, 3,970 feet ($1210^{m}1$) high, of irregular outline, deeply furrowed, and of light colour, rising abruptly from the coast in the vicinity of Ras Abu Dāud (*see* view on chart 38). When seen from a distance, bearing about 312°, Jabal Abu Dāud has the appearance of an island, steep on its seaward side with a long slope westward, there being a wide valley between it and the mountains of which Jabal Quraiyāt is the summit. The foot of Jabal Abu Dāud extends for a distance of about 8 miles along the coast.

The foregoing mountains are occasionally obscured by haze, but, under these conditions, their outline is often visible for a short time about sunset.

Charts 38, 2858,, 748b.

Chart 2851.

Bimma and Dhibab are small villages situated, respectively, about 6 and 12 miles north-north-westward of Ras ash Shajar; at the latter place there are some large date groves.

Daghmar, a small fishing village on a prominent hill, is situated about 8 miles south-eastward of Ras Abu Dāud, and 1½ miles southward of a low projecting sandy point. A well defined white fort on a small mound, visible above the trees, stands on the opposite side of a wadi and indicates the position of the hamlet; about 4 miles inland of it there is a range of low hills.

Quraiyāt, consisting of a number of stone houses and numerous huts, is situated about 3 miles southward of Ras Abu Dāud (*Lat. 23° 19′ N., Long. 58° 55′ E.*) on the sandy foreshore, backed by date groves, at the foot of Jabal Abu Dāud. A small creek, the bar of which is awash, is entered close southward of the hamlet, and close off its mouth is a rocky islet, about 50 feet ($15^{m}2$) high, on which there is a white square watch-tower, 20 feet ($6^{m}1$) in height, which forms a good mark. There is a prominent white, square building in the hamlet, and a similar one stands a short distance southward, but the latter is almost hidden in the date groves.

Anchorage.—For a distance of about 3 miles north-westward of the low point northward of Daghmar, the bottom is foul for about half a mile offshore.

Anchorage may be obtained off Quraiyāt, in a depth of 12 fathoms ($21^{m}9$), sand, about 1¼ miles offshore, with the rocky islet off the mouth of the creek bearing 227° and Ras Abu Dāud bearing 337°; steam vessels may anchor between Quraiyāt and Ras Abu Dāud, about 2½ cables offshore, in depths of from 4½ to 5 fathoms ($8^{m}2$ to $9^{m}1$).

Coast.—Ras Abu Dāud is steep and rocky, and is not easily identified at a distance as it is broken up into several points; about 1½ cables northward of it there is a rocky islet, about 100 feet ($30^{m}5$) high. Small vessels can obtain shelter during a shamāl in the small bay close southward of the point.

For about 4 miles north-westward of Ras Abu Dāud the coast is bordered by cliffs, from which Jabal Abu Dāud rises abruptly; thence it becomes low and sandy as far as Sīfa, a village about 6½ miles farther north-westward. Here the foot of the mountains trends inland and between it and the coast is a plain.

At Sīfa there is a square tower, standing on a mound about 60 feet ($18^{m}3$) high, with a date grove close to it.

A range of rugged precipitous hills extends from Sīfa to Ras al Hamar (page 49), about 20 miles north-westward, the intervening coast being bordered almost entirely by cliffs alternating with small sandy bays and inlets or coves.

Ras al Khairān, about 5 miles north-north-westward of Sīfa, is a vertical cliff, about 60 feet ($18^{m}3$) high, of a light colour, as also are the hills within it. (*See* view facing page 44.) There are four small sandy bays south-eastward of Ras al Khairān:—Khaisat as Sum is the south-easternmost; Sifat ash Shaikh, the next, in which there is a grove of date trees; and the north-westernmost, between Ras Kizkizan, a rocky peninsula, on its eastern side, and Ras al Khairān, has depths of about 3 fathoms ($5^{m}5$), but it is open north-eastward.

Charts 38, 2858, 748b.

Chart 3518, plan of Bandar Khairan.

Bandar Khairān.—Anchorage.—Immediately westward of Ras al Khairān are two islands, but, owing to the similarity of their appearance with, and their closeness to, the mainland, they are not easily distinguished. In the channel between the western island and the mainland is Bandar Khairān (*Lat. 23° 32′ N., Long. 58° 44′ E.*)

There is a small rocky detached islet close off the north-eastern side of the eastern island; the channel southward of the island, in which there is a rock above water, is narrow, tortuous, and shallow.

The western island is about 300 feet (91^{m}4) high, steep, and rocky; close to its north-eastern end there is a small detached rock above water, between which and the eastern island is the eastern entrance channel. The anchorage in the channel between the western island and the coast southward of it has a least width of 70 yards (64^{m}0), with depths of from 19 to 30 feet (5^{m}8 to 9^{m}1) in the fairway; off the south-western part of the island there is a rocky islet with depths of 36 feet (11^{m}0) in the channel northward of it, and from 18 to 36 feet (5^{m}5 to 11^{m}0) in the channels on its other sides. Southward of this islet is a narrow passage leading into a hollow bay extending about one mile southward, and ending in a swamp; on its shores is a large grove of date trees and a small village.

This harbour is only frequented by fishing boats; the winds are usually baffling, especially in the western entrance, and blow in violent gusts during a strong shamāl.

Chart 2851.

Coast.—Khōr Yenkit is entered about 1½ miles west-north-westward of Bandar Khairān. The village of Yiti stands on the shore of a small sandy bay about 2¼ miles west-north-westward of Bandar Khairān, the coast between being rocky cliffs. Hassar Shaikh, about 80 feet (24^{m}4) high, stands on the foreshore at Yiti, with a smaller rock, about 50 feet (15^{m}2) high, eastward of it; these rocks show up well from seaward, as they appear black against the light-coloured hills inland. The most sheltered landing place is about 3 cables westward of Hassar Shaikh; but a small coral reef, which probably dries, lies in the approach.

Close westward of Hassar Shaikh is the entrance to a small lagoon, the channel into which runs parallel with the coast behind Hassar Shaikh. Small boats can enter at half tide; the lagoon is suitable for seining and fish are plentiful.

Between Yiti and Bandar al Jissa, about 2 miles north-westward, the coast is rocky.

Chart 3518, plan of Bandar Jissa.

Bandar al Jissa.—Anchorage.—This bay is protected by a precipitous light-coloured island, about 140 feet (24^{m}7) high, on either side of which there is a channel leading into the harbour; close offshore in its south-western part is an islet. In the eastern entrance channel there is a least depth of 7 fathoms (12^{m}8) in the fairway; the western entrance is almost blocked by a flat rock with depths of 9 feet (2^{m}7) in the narrow channels on either side of it.

The headland which forms the eastern entrance point of the bay presents, when approached from either direction along the coast, a remarkable likeness to a black sheep's head. The bay is difficult, however, to identify from seaward at a distance greater than one or 2 miles; the best guide to its locality is the very light colour of the

Charts 38, 2858, 748b.

Chart 3518, plan of Bandar Jissa.

cliffs in the immediate vicinity; its position in relation to Hassar Shaikh also forms a guide.

Westward of the islet in the bay is a village which was reported in 1919, to have fallen into decay, there being at that time not more than 50 inhabitants. The best landing place is reported to be on the sandy beach in front of the village.

Anchorage may be obtained in Bandar al Jissa (*Lat. 23° 33′ N., Long. 58° 39 E.*), in depths of from 4 to 7 fathoms (7^{m}3 to 12^{m}8).

Chart 2851.

Coast.—The coast between the western entrance point of Bandar al Jissa and Muscat, about 5 miles north-westward, is indented by a succession of sandy bays separated by rocky points. There are numerous hills near the coast, behind which mountain ranges extend inland.

Jabal Barda, about 3½ miles west-north-westward of the western entrance point of Bandar al Jissa, and about 1½ miles inland, rises to an elevation of 1,340 feet (408^{m}4); it terminates in two sharp peaks which form the summits of a very rugged dark range and when in line bear about 250°; the hill, however, is not particularly prominent from northward, as the peaks then appear to be some distance apart. *See* view A on chart 2851.

Several villages stand on the shores of the sandy bays mentioned above. In the vicinity of Al Bustan, the southernmost, about 1½ miles south-eastward of Jabal Barda, there is a date grove. Qantab, a small fishing village lies under Jabal Barda; in the bay, a pyramidal rock lies close offshore, near the village.

Charts 2869, 2851.

Sidāb is a fishing village on the northern shore of Bandar Sidāb, situated about 3½ miles north-westward of Bandar al Jissa; it is separated from Muscat by a short ridge. The coast on either side of Sidāb is bordered by cliffs rising to rugged hills.

Chart 2869.

Ras al Kanāda, about half a mile north-eastward of Sidāb, terminates in a cliff about 250 feet (76^{m}2) high, with Pillar rock, about 100 feet (30^{m}5) high, about 1½ cables northward of it. Two small rocks, from 4 to 6 feet (1^{m}2 to 1^{m}8) high, lie within one cable of the coast about a quarter of a mile north-westward of Pillar rock (*Lat. 23° 37′ N., Long. 58° 36′ E.*).

Khōr Mughab is a small cove, about half a mile north-westward of Pillar rock, which affords good landing for boats southward of Hisar Jalāli (page 45). Anchorage, affording shelter during a shamāl, may be obtained off Khōr Mughab southward of Jazīrat Muscat, but care must be taken to avoid anchoring in the area indicated by pecked lines on the chart owing to existence of cables.

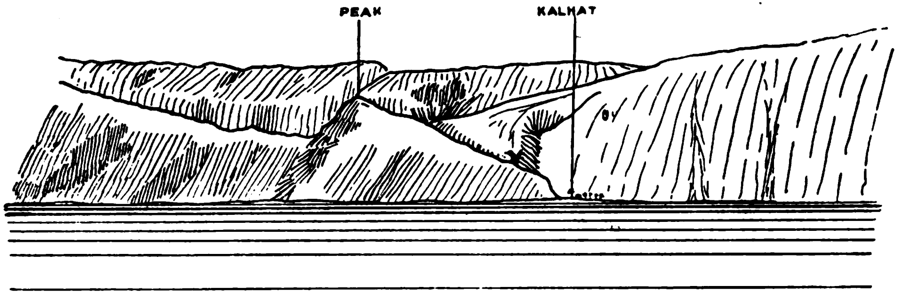
Charts 2869, 2851.

KHŌR MUSCAT.—Aspect.—This cove is entered between Ras Muscat, the northern extremity of Jazīrat Muscat, also known as Al Jazīrat, and Ras Kalbūh, about 5½ cables west-south-westward.

From eastward or north-westward, Jabal Barda is remarkable; about 30 miles south-south-eastward of Muscat is Jabal Quraiyāt (*see* page 41), west-north-westward of which are Jabal Tāyīn and Jabal Nakhl (page 50) with low ranges between them and the coast. From west-

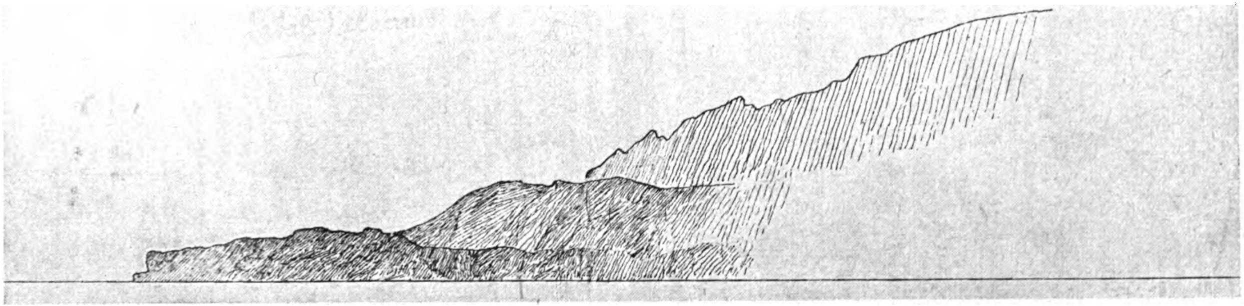
Charts 38, 2858, 748b.

To face page 44.



Coast in the vicinity of Kalhāt from eastward.

(*Original dated* 1914.)

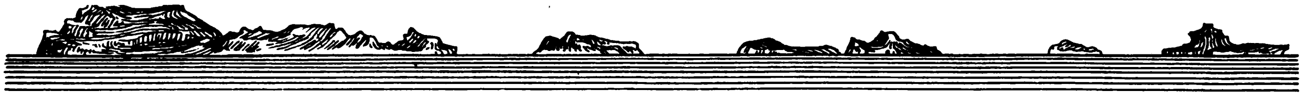


Ras al Khairān,
bearing 137°,
7 *miles.*

Ras al Khairān from north-westward.

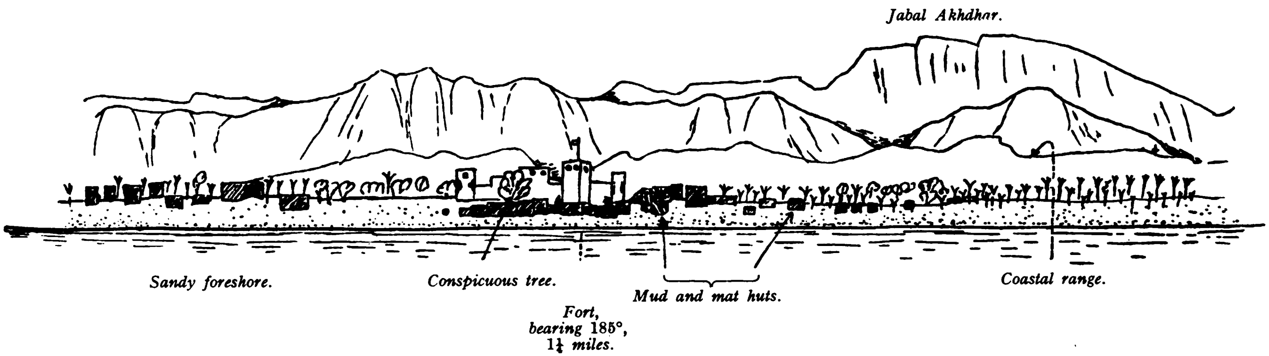
(*Original dated* 1908.)

To face page 45.



Jezāir as Suwādi from north-westward.

(*Original dated prior to* 1860.)


Jabal Akhdhar.
Sandy foreshore.
Conspicuous tree.
Fort,
bearing 185°,
1¼ *miles.*
Mud and mat huts.
Coastal range.

As Suwaiq from northward.

(*Original dated* 1922.)

Charts 2869, 2851.

ward or northward Fahl (page 49) is a good mark. Buma Sāli is a very prominent tower, situated about 2¼ cables southward of Khōr Mughab.

Chart 2869.

The coast of Jazīrat Muscat is rocky and precipitous. A pillar rock, about 100 feet ($30^{m}5$) high, lies close off its south-eastern extremity. The western side of the island is covered with the names of European vessels of different nationalities, painted in white on the rocks, a time-honoured custom whereby their first visit is recorded. In several cases the White Ensign (with yellow staff) is depicted with the name of the vessel, the position of that painted by H.M.S. *Perseus* being indicated on the chart.

Ras Muscat (*Lat. 23° 38′ N., Long. 58° 36′ E.*) is a round sloping bluff with cliffs southward of it. (*See* view facing this page and on charts 2869 and *2851*). A reef extends about a quarter of a cable northward from the point, and about a quarter of a cable farther northward is Fisher's rock, 10 feet ($3^{m}0$) high, with depths of from 2 to 3 fathoms ($3^{m}7$ to $5^{m}5$) between.

A round tower is situated on the north-western point of Jazīrat Muscat, about three-quarters of a cable westward of the lighthouse.

Berij Sira is situated on the northern slope of the island, 1¾ cables southward of Ras Muscat.

Ras Kalbūh is the northern extremity of a detached precipitous ridge rising to an elevation of 435 feet ($132^{m}6$), about 3 cables southward; at the northern end of the ridge, about half a cable south-south-eastward of the lighthouse (*see* below), is a prominent white tower with a flagstaff; the ridge slopes down at its south-eastern end to a cliff, about 150 feet ($45^{m}7$) high, on which is Hisār Mīrāni with a battery on the shore below it, situated about 6½ cables south-south-eastward of Ras Kalbūh.

Sira al Gharbiyah (Gharbi) is a fort, with two tiers of embrasures and a round tower on its highest part, standing on the extremity of a spur which projects eastward into the cove from the middle of the ridge, about 3¾ cables south-eastward of Ras Kalbūh. In 1943, this fort was in ruins. *See* view on chart 2869.

Hisār Jalāli, with two tiers of embrasures, crowns the summit of a small detached hill, about 150 feet ($45^{m}7$) high, in the south-eastern corner of Khōr Muscat on the northern side of Khōr Mughab. Between this hill and the southern end of Jazīrat Muscat is a detached islet, about 100 feet ($30^{m}5$) high, which is connected with the coast southward by a reef; between this islet and Jazīrat Muscat is a boat passage named Duwairah (Duweira), which dries.

The town of Muscat is situated at the head of Khōr Muscat. This town, and also those immediately north-westward of it, do not show up well under the dark hills and are only visible when the coves, at the head of which they are situated, are open. In the morning, with the sun shining on it, Hisār Jalāli sometimes shows white on westerly bearings against the dark hills behind it.

Mersa Makallah is the shallow indentation on the western side of the cove, southward of Sira al Gharbiya; it is used as an anchorage for the smaller native craft; on the shore at the head of the bay are some coal sheds, which in 1943 were in ruins, from which a pier, with a depth of 4 feet ($1^{m}2$) at its head, extends east-north-eastward; the pier is

Charts 38, 2858, 748b.

of no use as a landing place for Muscat as there is no communication by road.

Danger.—A rocky patch, with a depth of 2 fathoms (3^m7), lies about half a cable from the western side of Jazīrat Muscat, about 2 cables southward of Ras Muscat. Fisher's rock (*Lat. 23° 38′ N., Long. 58° 36′ E.*), bearing about 020°, and well open westward of the north-western extremity of Jazīrat Muscat, leads north-westward of the danger; and Pillar rock, bearing about 144°, and well open of the south-western extremity of that island, leads westward of it.

Lights.—A light is exhibited, at an elevation of 273 feet (83^m2), from a white tower, 14 feet (4^m3) in height, on the northern summit of Jazīrat Muscat, about one cable southward of Ras Muscat.

Leading lights are exhibited, the front light, at an elevation of 62 feet (18^m9), from the flagstaff at the British Consulate, about half a cable south-westward of Hisār Jalāli; and the rear light, at an elevation of 165 feet (50^m3), from a position about 2½ cables south-south-eastward of the front light-structure. These lights in line, bearing 159°, lead into Khōr Muscat, but are reported to be unreliable.

Anchorage.—Directions.—Small vessels should anchor off the western shore of the cove, near Sira al Gharbiya. A good berth for a vessel of moderate size is on the line of the leading light structures and westward of a white-topped pinnacle rock, situated about 2¼ cables southward of Ras Muscat; it was reported, in 1946, that the white-topped pinnacle rock was difficult to identify. The cove, however, is open to the shamāl, and as that wind usually blows a couple of points off the western shore while the sea sets straight in, it is advisable during its continuance to lay out a stern anchor to keep the vessel head on to the swell. During hot weather, the vessel's stern may be hauled in towards the white-topped pinnacle rock by a hawser secured to it or, preferably, by a stern anchor laid out in that direction; in this position she will lie broadside on to the breeze. There is another convenient rock to which a stern hawser may be secured, the position of which is easily identified for it is a large, round, dark-coloured rock and immediately behind it "H.M.S. *Philomel*" is painted in white letters on a blue ground.

The nashi sends in a heavy swell, and there is little or no shelter from it; but the bottom is of sand and shells, and with a long scope of cable vessels seldom drag; moreover, near the rocks there appears to be a rebound of the sea which lessens the strain on the cable.

Outside the cove, in depths over 20 fathoms (36^m6), the bottom is of clay or mud.

A vessel should enter the cove with the leading light structures in line; the rear light structure may be identified by its proximity to the eastern extremity of the wall, marked by a black and white patch. eastward of Buma Sāli (*Lat. 23° 37′ N., Long. 58° 36′ E.*). She should not anchor until the pinnacle rock with the white top bears less than 109°, so as to clear the 2-fathom (3^m7) patch near it.

The usual landing place is at a concrete pier at the south-western corner of the cove; there are depths of from 4 to 6 feet (1^m2 to 1^m8) on the eastern side and about 2 feet (0^m6) on the southern side of the pier; the northern side is foul. Landing can also be effected in a small boat on the beach immediately in front of the British Consulate. When there is a surf on the beach the best landing is in Khōr Mughab,

Chart 2869.

access to which can be had by proceeding through Duwairah passage.

Muscat.—This picturesque town is protected on its eastern and part of its southern sides by precipitous hills, the remainder of the southern side, and the western side, is protected by a wall. Outside the wall, and between it and the rugged hills encircling the town, every available level spot is occupied by mat huts.

The Sultan's palace, about 1¼ cables westward of the British Consulate, is the largest building on the sea front; the mosques are small and have neither dome nor minarets. In addition to those already mentioned, there are several towers on the surrounding hills.

Muscat is the capital of 'Omān and, with Al Matrah (page 48), had, in 1952, a population of about 12,000.

Great Britain is represented by a Political Agent who is also the consul.

Port facilities.—Fresh provisions are plentiful, though in summer vegetables are scarce.

There is a hospital situated westward of the British Consulate.

Trade.—The principal exports are dates and dried fish; the chief imports are rice, coffee, cotton piece goods, wheat and flour.

Health.—Muscat may be considered to be a fairly healthy port, provided ordinary precautions are taken; if using shore water it should be purified by boiling or filtration, and care must be taken to protect oneself from mosquitos, which during winter, are numerous in the town, and cause a considerable amount of malaria amongst the natives.

Climatic table.—*See* page 28.

Communications.—Mail steamers call at Muscat on their way to and from the Persian gulf; except for these, few steam vessels enter the port.

Muscat is connected to the general telegraph system.

There is a radio station, *see* page 18, at the post office.

Consul.—A British Consular officer is stationed at Muscat (*Lat. 23° 37′ N., Long. 58° 36′ E.*).

COAST.—Khōr Kalbūh is entered between Ras Kalbūh and Ras al Baz, about 3¾ cables westward.

Ras al Baz rises to a solitary hill, about 100 feet ($30^{m}5$) high, situated at the end of a promontory fringed with drying reefs and on the summit of which is a round tower. The hill is connected with the higher part of the promontory, southward of it, by a sandy isthmus on which stands the village of Dōhab (Doha).

A rocky spit, which dries about 8 feet ($2^{m}4$), extends about half a cable offshore close southward of Ras Kalbūh.

Kalbūh is situated at the head of the cove and extends into the pass leading to Muscat, to the western surburbs of which it is almost joined.

Dōhat Matrah.—Dōhat Matrah is entered between Ras al Baz (*Lat. 23° 38′ N., Long. 58° 35′ E.*) and Ras Kowāsir, about three-quarters of a mile north-westward. The latter is a precipitous point with a low white islet lying about one cable north-eastward of it, and a rocky ledge, on which are some rocks about 50 feet ($15^{m}2$) high, extending about three-quarters of a cable eastward from its south-eastern extremity.

Charts 2851, 38, 2858, 748b.

Chart 2869.

Jabal Matrah, the summit of a range of hills, is remarkably sharp and rises to an elevation of 1,010 feet ($307^{m}9$), about one mile south-south-westward of Ras al Baz.

Khōr Riyām, at the head of which is the village of Riyām, is situated in the south-eastern part of the bay. The castle of Al Matrah stands on the summit of a detached hill, about 100 feet ($30^{m}5$) high, on the southern shore of the bay, about three-quarters of a mile west-south-westward of Ras al Baz. This hill separates the village of Matairah, eastward of it, from the walled town of Al Matrah, in the south-western corner of the bay. Other villages stand on the shores of the small indentations in Dōhat Matrah.

A small rock, over which there is a depth of 1½ fathoms ($2^{m}7$), lies about 1¾ cables north-eastward of the north-north-western tower of the castle of Al Matrah.

Anchorage.—Dōhat Matrah affords good shelter in a shamāl, but is open to the nashi. The larger native vessels always anchor in this bay in preference to Khōr Muscat. The anchorage is off the north-western shore, 3 or 4 cables north-eastward of Hisār Arbaq (South), about 4 cables south-westward of Ras Kowāsir.

In 1935, H.M.S. *Shoreham* rode out a strong shamāl with the tower on Ras al Baz bearing 090°, distant 7 cables.

Coast.—Khōr Shataifa, entered between Ras Kowāsir and Ras ash Shataifa, about 3 cables north-north-westward, is exposed to the nashi, and is therefore not used as an anchorage.

Ras ash Shataifa is a vertical cliff, at the north-eastern end of a ridge of hills, from 200 to 300 feet ($61^{m}0$ to $91^{m}4$) high. The small village of Shataifa is situated at the head of the cove.

Chart 2851.

The coast between Ras ash Shataifa and Ras Aiyint, a small projecting point, about one mile westward, is cliffy. Little Mersa Dārsait is a small shallow bay, westward of Ras Aiyint, which is well sheltered by rocks and in which small boats can safely anchor. On the shore of the bay are a few huts.

Chart 3518, plan of Dārsait anchorage.

Mersa Dārsait.—Rock.—About 2½ miles westward of Ras ash Shataifa is the mouth of a deep valley covered with palm trees, at the foot of which, situated on a sand and shingle beach, is the village of Dārsait.

Open anchorage may be obtained, in a depth of about 6 fathoms ($11^{m}0$), sand, about a quarter of a mile northward of the village, but rocks extend about one cable offshore on either side of it.

A rock, with a depth of 12 feet ($3^{m}7$), was reported, in 1915, to lie about 2¼ cables offshore, 6½ cables north-eastward of the fort in the village, and a ledge of rocks extends nearly one cable north-eastward from the western end of the beach.

The beach is fairly steep-to, and landing in ordinary weather is easy; but it would probably be impracticable during either a shamāl or a nashi; the best place appears to be at the western end of the beach.

The village (*Lat. 23° 38′ N., Long. 58° 32′ E*) is in two parts; a stone fort, about 15 feet ($4^{m}6$) in height, stands in front of the western part and is the only stone building; a smaller fort is hidden amongst the huts of the eastern part.

Charts 38, 2858, 748b.

Chart 3518, plan of Dārsait anchorage.

There are two towers on the spurs of the hills, on either side of the valley; that on the eastern side is about 30 feet (9^{m}1) in height, and that on the western side, which is in ruins, 50 feet (15^{m}2).

Chart 2851.

Coast.—Islet.—Close westward of Dārsait, a remarkable red hill, the summit of which is in the form of paps, rises above the cliffs at its base to an elevation of about 400 feet (121^{m}9), whence a sandy beach extends about a mile north-westward to a sloping point, named Ras al Abyadh. A short distance westward of this point is Ras al Hamar, a red cliffy point, about 150 feet (45^{m}7) high.

Fahl, a precipitous islet, about 280 feet (85^{m}3) high, and steep-to, lies about 2 miles northward of Ras al Hamar. It is of a light colour and usually shows up against the land (*see* view B on chart 2851). Landing can be effected only at its south-western point for the cliffs are overhanging on all other sides. The passage between the islet and the mainland is clear of dangers in the fairway and deep.

From Ras al Hamar, the coast trends south-westward and westward for about 20 miles, forming Kubbat al Hail, a large sandy bay, at the eastern end of which there is a small creek, with a few huts and mangrove trees.

Ghukra and Khalil are two small villages, about a quarter of a mile apart, situated about 7 miles westward of the entrance to the creek. They stand on the eastern and western sides, respectively, of a date grove and consist entirely of mat huts which are not easily identified. The date grove is fairly prominent and lies in a dip of the sand dunes, which fringe the coast and is elsewhere about 20 feet (6^{m}1) high; it lies about 3 cables inland and can be clearly seen from seaward from a distance of about 4 miles. Westward of Khalil there are no date palms until the vicinity of Hail al 'Amair (*Lat. 23° 40′ N., Long. 58° 14′ E.*), about 7 miles north-westward is reached.

AL BĀTINA.—General remarks.—The cost of this important maritime district of the Sultanate of 'Omān extends westward and north-westward for about 140 miles from Hail al 'Amair almost to Khatmat Milāha, a spur of the hills descending close to the coast, 3 miles north-north-westward of Al Murair, (*see* page 55); the whole of this stretch is about 25 feet (7^{m}6) high, and sandy, with many towns and villages, each one having a fort, more or less in ruins; date groves are almost continuous along the coast, but here and there are sand hills; the coast is seldom visited by Europeans. The country inland, for a distance of about 12 miles, is generally level.

With the exception of those in the vicinity and southward of the Daimāniyāt islands (page 51), the coast is clear of off-lying dangers, but it possess neither harbour nor creeks that will admit any but very small boats. It is quite open both to the shamāl, and to the nashi, and for the latter it is a lee shore, consequently, all trade with Muscat is carried on in boats which can be hauled up on the beach in bad weather.

The depths offshore appear to be regular, but the whole coast has been imperfectly surveyed.

A vessel should not anchor in depths of less than 5 fathoms (9^{m}1), especially during the shamāl season; within this depth the bottom is very uneven and in places rocky. Landing is usually difficult.

Charts 38, 2858, 748b.

Chart 2851.

The hills trend south-westward from Ras al Hamar (*Lat.* 23° 39′ *N.*, *Long.* 58° 31′ *E.*), and increase in height until they culminate in Jabal Tāyīn, 5,250 feet (1600^{m}0) high, situated about 21 miles from the point; White hill, about 8 miles south-westward of the point and 4 miles inland, may be identified by its colour.

Wādi Samāil, a great valley, separates the ranges of Jabal Tāyīn and Jabal Nakhl, the latter extending north-eastward and south-westward on the western side of the valley. The Nakhl range has four principal peaks, the highest, situated about 45 miles south-westward of Ras al Hamar, rising to an elevation of 7,740 feet (2359^{m}2). Jabal Nakhl, about 7,000 feet (213^{m}6) high and 5½ miles farther north-eastward appears like a pepper-box on the top of the mountains; it is visible from off Muscat, but farther westward becomes hidden behind other peaks until near Barka, situated about 33 miles westward of Ras al Hamar.

Seen from north-westward it appears as one of the few sharp peaks along the coast which are indicated on the chart and is the most easily distinguished of the peaks of this range.

Jabal al Akhdhar is a range of mountains which rises in the middle to Jabal Sham, 10,190 feet (3105^{m}9) high, and extends north-westward and south-eastward. Jabal Sham is situated about 30 miles westward of the highest point of Jabal Nakhl, but it is not visible from eastward until clear of that range; it has two steps in its upper part, the northern face appearing almost precipitous, and its summit slopes gradually westward from them. There are lower ranges between it and the coast. (*See* view facing page 45).

From Jabal al Akhdhar a range of mountains extends in a northerly direction to the entrance of the Persian gulf and is visible from seaward for the whole of its length, gradually approaching the sea until, at Al Murair (page 5) there is only a comparatively narrow plain between the foothills and the coast.

Supplies of cattle, poultry, fish, and vegetables might possibly be obtained at the coastal towns.

Coast.—Anchorage.—Danger.—Hail al ‘Amair is a small village westward of which the date groves extend continuously to and beyond As Sīb.

As Sīb (*Lat.* 23° 41′ *N.*, *Long.* 58° 10′ *E.*), about 4 miles west-north-westward of Hail al ‘Amair, is a scattered town with two small detached forts. The position of the town is difficult to identify on account of the continuous coastal belt of palm trees. During the hot season, the mountains inland are seldom clearly visible except at sunrise and sunset. Two white-domed buildings and one of the forts are, however, visible from seaward, and at a short distance southward are two gaps in the palm trees about three-quarters of a mile apart, in the western of which there is a ruined fort. From seaward of As Sīb, Jabal Barda is a good mark. The town is cooler and healthier than Muscat.

Anchorage may be obtained off As Sīb, in a depth of about 5 fathoms (9^{m}1), sand, about half a mile offshore, but there is no protection whatever.

Ras al Ghaf is a broad low point about 5 miles westward of As Sīb; in its vicinity for a distance of about 4 miles, there are no date trees near the coast, and sand hills rise at a short distance inland. The

Charts 38, 2858, 748b.

Chart 2851.

point is named from two large ghaf or acacia trees, which, prior to 1870, stood on its most projecting part.

A sand bank, with a depth of 3 fathoms ($5^{m}5$), lies about 1½ miles northward of Ras al Ghaf; between the bank and the coast, there is a depth of about 4 fathoms ($7^{m}3$).

Off-lying islands.—Dangers.—Anchorage.—Daimāniyāt islands, called by the Arab seamen Saba jazāir, lie nearly parallel with the coast and from 7½ to 9 miles offshore; they are all quite barren and waterless, and are frequented by fishermen from the mainland.

Jazīrat Kharāba, the eastern of these islands, is situated about 8½ miles northward of As Sīb, and is about 30 feet ($9^{m}1$) high, with black rocky points separated by white sandy beaches; a reef extends about half a mile off its northern and eastern sides, and there are depths of 20 fathoms ($36^{m}6$) a quarter of a mile off it. There are several detached rocks round the island.

The easternmost islet of the middle group, which consists of seven islets and some detached rocks, lies 3 miles west-north-westward of Jazirat Kharāba. The two largest islets of this group are 53 and 83 feet ($16^{m}2$ and $25^{m}3$) high, respectively, with low cliffs of light-brown colour, difficult to distinguish at night. On the westernmost and largest islet are two small hills separated by a valley. The islets are reported to be steep-to, with no off-lying shoals, but soundings are no guide to a vessel approaching them from southward. H.M.S. *Hastings* anchored, in 1931, about 4½ cables southward of the eastern end of the westernmost islet of this group, in a depth of 15 fathoms ($27^{m}4$), sand. This position provided good shelter from a heavy swell which, due to a light shamāl then blowing, was rolling in round the islets. There are two good sandy beaches near the middle of the southern side of the westernmost islet where landing was easily effected.

The western group, consisting of Jazīrat Jun and three islets or rocks, lies about 3½ miles west-south-westward of the middle group, the passage between being clear with depths of about 19 fathoms ($34^{m}7$). Jazīrat Jun is 100 feet ($30^{m}5$) high near its western end, of light-brown colour, and is not easily seen at night. Fair anchorage may be obtained on the southern side of Jazīrat Jun, in depths of from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$), sand, about a quarter of a mile off a small sandy beach; the position is sheltered from northward, though much swell rolls round the islet during strong winds. Half a mile southward of Jazīrat Jun (*Lat. 23° 50′ N., Long. 57° 58′ E.*), is a rock, with a depth of less than 6 feet ($1^{m}8$). A spit, with a depth of 2 fathoms ($3^{m}7$), extends about 1½ cables south-eastward from the western islet or rock.

Clive rock lies about one mile west-north-westward of Jazīrat Jun; it is detached and has a depth of 9 feet ($2^{m}7$), coral rock, around which there are depths of from 14 to 20 fathoms ($25^{m}6$ to $36^{m}6$) at a distance of a quarter of a mile. The rock is visible from aloft when the sun is in a favourable position.

The depths southward of Daimāniyāt islands are fairly regular and less than 20 fathoms ($36^{m}6$), except in the vicinity of the eastern group. In depths of less than 20 fathoms ($36^{m}6$), the bottom is mud and sand; in greater depths it is chiefly mud.

Coast.—Anchorages.—Danger.—Abu Nahail is a hamlet situated about 8 miles westward of As Sīb. About 7 miles farther westward is

Charts 38, 2858, 748b.

Chart 2851.

the town of Barka, in the middle of which is the Shaikh's castle, a lofty and prominent building with four large flanking towers at its corners. The town extends for about 3 miles along the coast amongst the date plantations which border the coast nearly to Ras al Ghaf. The Sultan is represented by a Wali.

Anchorage may be obtained in the vicinity of Barka, about one mile offshore, in a depth of about 6 fathoms ($9^{m}1$), sand; the depths decrease regularly towards the coast, but the anchorage is unsheltered; when in depths of less than 4 fathoms ($7^{m}3$) the bottom becomes visible. Within a distance of about 3 miles north-eastward of this anchorage there are irregular depths of between 5 and 9 fathoms ($9^{m}1$ and $16^{m}5$). In 1931, H.M.S. *Penzance* anchored in a depth of 3½ fathoms ($6^{m}4$), sand, with the fort bearing about 189°, distant 5½ cables.

Ras Suwādi, about 7¼ miles north-westward of the castle at Barka, is a low sandy projection; the date groves on the coast terminate about 1½ miles south-eastward of the point.

Jabal 'Add is the easternmost and largest island of a group of seven islets, named Jazāir as Suwādi, lying about 2 cables off Ras Suwādi; it is 271 feet ($82^{m}6$) high, and table-topped, but there is a gap in it, and on its seaward side it is cliffy; on its western side there is a small sandy bay. The channel between Ras Suwādi and Jabal 'Add (*Lat. 23° 47′ N., Long. 57° 48′ E.*) dries from 2 to 3 feet ($0^{m}6$ to $0^{m}9$).

The six islets lying west-north-westward of Jabal 'Add are from 50 to 121 feet ($15^{m}2$ to $36^{m}9$) high, and precipitous; Makbara, the southern, has a tower on its south-eastern end, and there is also a tower on the summit of the western islet. *See* view facing page 45.

Between Makbara and the coast, there is a boat anchorage about half a mile in extent, with a depth of about 6 feet ($1^{m}8$), close to the islet, where native vessels anchor partly sheltered from the prevailing winds. The entrance is close south-westward of the islet; in the date season, this anchorage is crowded.

A small vessel might obtain anchorage, sheltered from the shamāl, in a depth of 4 fathoms ($7^{m}3$), close off the south-eastern side of Jabal 'Add, but she would be on a lee shore should a nashi come on.

Close outside Jazāir as Suwādi there are depths of from 4 to 5 fathoms ($7^{m}3$ to $9^{m}1$).

In 1934, H.M.S. *Fowey* obtained anchorage, in a depth of 5 fathoms ($9^{m}1$), fairly sheltered from the nashi, in a position about 1½ miles westward of Jabal 'Add.

Al Masna'a, about 8 miles westward of Ras Suwādi (*Lat. 23° 46′ N., Long. 57° 48′ E.*), is a village, in the middle of which there is a prominent fort, with a tower surmounted by a flagstaff. About one mile farther westward is Ash Shirs, a straggling village, in which there is a square ruined fort and some trees. There are depths of 3 fathoms ($5^{m}5$) about one mile offshore. Al Awaid, Wudām and Khabbah are villages situated about 2½, 5½ and 8 miles, respectively, west-north-westward of Ash Shirs. Wudām may be identified by its mosque, a white square building, in its centre. There is a ruined fort at Khabbah. In 1930, H.M.S. *Cyclamen* anchored off Wudām, in a depth of about 4¾ fathoms ($8^{m}7$), about 1¼ miles offshore. In 1934, H.M.S. *Fowey* anchored, in a depth of 6 fathoms ($11^{m}0$), with the ruined fort at Khabbah, bearing 198°, distant 1½ miles.

Charts 2858, 748b.

Chart 2851.

As Suwaiq, about 10½ miles west-north-westward of Ash Shirs, is a partially walled town, in the middle of which there is a large and prominent fort of a light yellow colour with a tower in the middle and on each of the four corners, the highest being surmounted by a flagstaff. (*See* view facing page 45). About 16 miles south-westward of the town, are two well defined hills, from 700 to 1,000 feet ($213^{m}4$ to $304^{m}8$) high and of a light yellow colour, which show up well against the dark mountains inland when the sun is shining upon them. Outside the walls of the town are many mat huts. The Sultan is represented by a Wali.

A shoal extends from the coast in the vicinity of As Suwaiq, with depths of 2½ fathoms ($4^{m}6$) at 12 cables, and 3¼ fathoms ($5^{m}9$) at nearly 14 cables from the fort.

Ridda, about 2 miles westward of As Suwaiq, is the most important of several villages on the coast between As Suwaiq and Al Khadhra.

Al Khadhra is a village which extends along the coast for about one mile from a position about one mile westward of Ridda. A fort, with two partly ruined towers, stands in the centre of Al Khadhra. From northward the towers of the fort are difficult to distinguish, particularly after noon, as from this direction only the ruined interiors are visible. Mud huts extend without a break between As Suwaiq and the northern end of Al Khadhra.

Discoloured water extending up to 2½ miles offshore was observed in this vicinity, in 1934, by H.M.S. *Fowey*.

Anchorage was obtained, by H.M.S. *Cyclamen*, in October, 1930, in a depth of about 4 fathoms ($7^{m}3$) with the fort at Al Khadhra bearing 182°, distant 9 cables.

Charts 2851, 2837.

Al Khābūra (*Lat. 24° 00′ N., Long. 57° 07′ E.*), about 14 miles west-north-westward of Al Khadhra, is one of the principal towns on this coast, having a large trade with Bahrein (page 203) and the Shatt al 'Arab (page 253). It may be identified by its northern part, which is of stone and mud instead of the usual mat structures; there is also a dilapidated fort, from the tower of which the Wali's flag is displayed. The depths off the town of less than 5 fathoms ($9^{m}1$), are very irregular. There are two prominent mountains lying about 20 and 25 miles respectively, south-westward of Al Khābūra; the northern one consists of a jagged ridge culminating at its north-eastern end in a triple-pointed, tooth-shaped peak, and the southern one is about 3,000 feet ($914^{m}4$) high, bluff, and wedge-shaped. At Kasbiya, a village close northward of Al Khābūra, there are two distinctive forts, the southern of which has one tower and the northern two.

In 1937, anchorage was obtained, in a depth of 5 fathoms ($9^{m}1$), with the fort at Al Khābūra bearing 232°, distant 7½ cables.

About 6½ miles north-westward of Al Khābūra is Ras al Hayari, on which there is a village with two mud forts, the southern of which is square and has one tower, whereas the northern is square but has three towers. There are many huts between the coast and the date groves in rear. Majasaa, situated about 3 miles north-westward of Ras al Hayari, is a village in which there is a low fort with a single round tower at its north-western end. Dīl, about one mile north-westward of Majasaa, has two low forts, about a quarter of a mile apart, with huts between them and the coast.

Charts 2858, 748b.

Charts 2851, 2837.

Umm al Jaarif, about one mile north-westward of Dīl, is a small village which may be identified by a large square castellated tower of a darker colour than is usual on this coast. Makhailif, about one mile north-westward of Umm al Jaarif, is a small village with a large high fort, which is the best mark on this part of the coast; a large, prominent dark tree stands on the coast about half a mile south-eastward of the fort. As Saham, about 4 miles north-westward of Makhailif, is a large village, in which there is a low square fort, but owing to the date palms in rear it is difficult to identify. The fort is most easily distinguished on a west-south-westerly bearing; it has two towers but they rise only a few feet above the rest of the building, and in front of it are two tall palms. About half a mile southward of the fort, is a tower, the top of which is in ruins; it is visible from southward, but not from northward. The huts of the village extend along the coast for about one mile.

It was reported, in 1939, that the above information regarding the coast between Khābūrah and Sohār was incomplete and, in places, inaccurate; it should therefore be used with caution.

In 1934, H.M.S. *Fowey* anchored, in a depth of 5½ fathoms (10^{m}1), with As Saham fort bearing 232°, distant 9 cables.

There are three villages between As Saham and Sohār, one of which may be distinguished by a low fort with two towers situated about 4½ miles north-north-westward of the fort at As Saham.

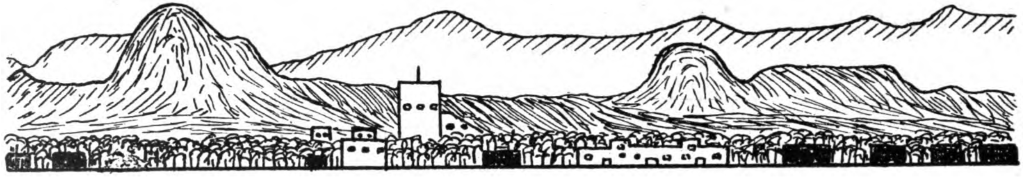
Sohār.—Anchorage.—Sohār, about 13 miles north-westward of As Saham, is a walled town with a moat. In it is a fort, in which there are several large round trees and a square tower, about 110 feet (33^{m}5) high, surmounted by a flagstaff (*see* view facing this page). This tower is very prominent and is visible from seaward before the date groves, which are continuous in this locality, come into view; it has been sighted from a distance of 12 miles. There are numerous mat huts outside the walls, in the date groves along the beach. The Sultan is represented by a Wali, who lives in the fort.

Hūra Bargha (Sohār peak) (*Lat. 24° 17′ N., Long. 56° 33′ E.*), rises from the plain, in front of the main mountain ranges, about 12 miles south-westward of the town, to an elevation of 1,550 feet (472^{m}4); it is conical in shape, light brown in colour, and when visible is a good mark. *See* view C on chart 2851.

Anchorage may be obtained, in a depth of about 5 fathoms (9^{m}1), sand, about one mile off the town. The depths shoal gradually towards the coast. In 1931, H.M.S. *Triad* anchored in a depth of 4 fathoms (7^{m}3), with the fort at Sohār bearing 220°, distant about 9 cables, and the northernmost date palm, 309°; and in the same year, H.M.S. *Penzance* anchored in a depth of 3 fathoms (5^{m}5), sand, with the fort bearing 250°, distant 7 cables. In 1937, the anchorage was approached with Hūra Bargha in line with the fort, bearing 250°. Except in a calm sea, landing is bad owing to the surf on the sandy beach.

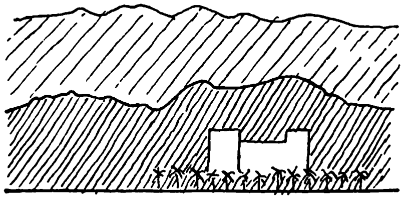
Coast.—Fāsiqa, about 6 miles north-westward of Sohār, is a straggling village with a fort on a slight rise at its northern end. In rear of the village is another fort with two date trees in front of it. There was a solitary bushy tree in 1911 on the beach northward of the village. Majīs, the largest village between Sohār and Ash Shinās (*see* below), is situated about 2 miles north-westward of Fāsiqa; it is composed of mat huts and in the centre of the village is a long low

Charts 2858, 748b.



Sohār from east-north-eastward.

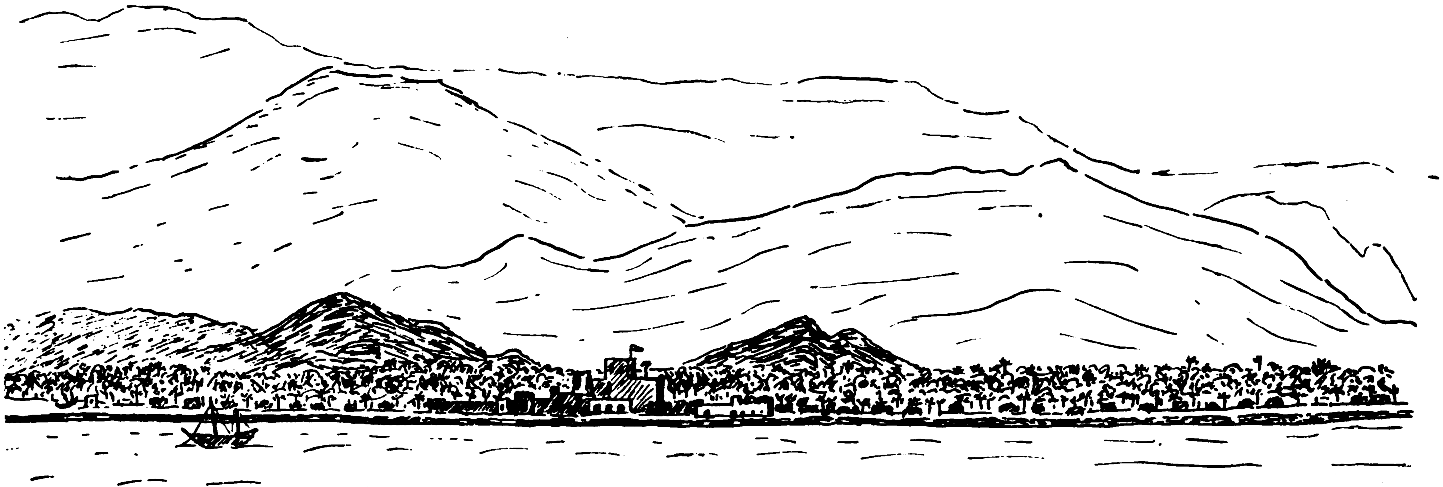
(*Original dated* 1927.)



Fujaira fort, bearing 258°, distant 10 miles.

(*Original dated* 1936.)

To face page 55.



Fort,
bearing 255°, 8 *cables.*

Ghālla from east-north-eastward.

(*Original dated* 1928.)

Charts 2851, 2837.

inconspicuous fort with a square tower in its north-eastern corner. Harmūl, about 3 miles north-westward of Majīs, is a village of huts with a large building on the beach at its south-eastern end.

Al Liwa is situated about 2¼ miles inland from Harmūl, and there is a large square fort with a square tower in the middle, which is visible from seaward above the date trees, situated about 1½ miles north-eastward of it. The large building at Harmūl may be identified in low visibility for, when in line with the fort at Al Liwa, it bears 266°. The peak shown on chart 2851, about 8½ miles south-westward of Harmūl, stands out well against the background of mountains; it is of a darker colour than Hūra Bargha.

Ash Shinās.—Anchorage.—About 14½ miles north-north-westward of Harmūl is Ash Shinās, a small town with a large fort, situated about 2½ miles southward of it. This fort is square and has a tower at its northern end. One side of the tower has fallen away; it is a good mark on southerly bearings, but difficult to distinguish when seen against the trees on northerly bearings. On north-westerly bearings, the fort presents a long low front, and on west-south-westerly bearings is visible from a considerable distance. Immediately in front of the fort is a large house, which is easily identified during the forenoon when it shows white with the sun shining on it. There is a square one-storied building about half a cable southward of the fort, the remainder of the town consisting of mud huts.

The town (*Lat. 24° 44′ N., Long. 56° 28′ E.*) shows up well against the background of trees, except from northward, from which direction only the tower of the fort is visible. The town is governed by a Wali; the Muscat flag is displayed from a mast standing on the remains of a tower at the south-eastern corner of the fort. A bare stretch of sand extends about 2 miles southward from the town. A creek, the mouth of which is situated about 1½ miles northward of the town, extends parallel with the coast along the whole of its frontage; the entrance, which may be identified by the break in the date palms, is prominent when bearing less than 300°. Dhows are usually to be seen in the creek, both northward and southward of the town.

Anchorage may be obtained, in a depth of about 5 fathoms ($9^{m}1$), a short distance northward of the town, off the mouth of the creek. The depths shoal gradually towards the coast. Landing can be effected at high water in the creek, but it is difficult with onshore winds owing to the surf and the shelving beach.

In 1934, H.M.S. *Fowey* anchored southward of the town, in a depth of 5 fathoms ($9^{m}1$), with the fort bearing 258°, distant 9 cables.

Coast.—Anchorage.—Al Khadhrawain, about 5½ miles northward of Ash Shinās, consists principally of mud huts, and is backed by date palms. Seen from north-eastward, the fort, with a tower at its southern end, is in the centre, and in front of it is a low stone building with four arches. A light coloured stone tower, a good mark when making Ash Shinās, stands at the southern end of the village, northward of a gap in the date palms.

Al Murair, about 13 miles north-north-westward of Ash Shinās, is a village with three large towers, two at its northern end and one at its southern end. About one mile southward of Al Murair, there is a large fort with two ruined towers in the vicinity of which there are several mat huts.

Charts 2858, 748b.

Charts 2851, 2837.

In 1934, H.M.S. *Fowey* anchored, in a depth of 5 fathoms ($9^{m}1$), with Al Murair fort bearing 210°, distant 11 cables.

Al Bātina coast ends about one mile northward of Al Murair and about 2 miles farther northward, Khatmat Milāha, a dark ridge of hills, slopes down to the coast.

Charts 2851, 2837, 753.

ASH SHUMAILĪYA.—Coast.—Anchorages.—Danger.—The coast of Ash Shumailīya, part of the Trucial state of Shārjah (*see* page 7), extends in a general northerly direction, for a distance of about 40 miles, from Khatmat Milāha to and including Dibba. The coast consists of cliffs alternating with sandy bays, in which there are some villages and date groves; the coastal plain gradually becomes narrower until, at about 20 miles northward of Khatmat Milāha, the hills slope down to the coast.

In Khōr al Kalba, 6 miles north-north-westward of Al Murair, there is a small village with a large round tower in the middle of it, and a fort; at the village there is a creek which may be entered by boats at high water. Hūra Bargha (page 54) appears triangular in shape when bearing less than 225°, and from off Khōr al Kalba it resembles a light-brown triangular island.

Ghālla or Kalba (*Lat. 25° 04′ N., Long. 56° 21′ E.*), about 3 miles northward of Khōr al Kalba, is a large village, in which there is a dilapidated fort, a large square building resembling a castle with a remarkable square tower, which may be identified on west-north-westerly bearings from a distance of about 15 miles. (*See* view facing page 55). From the village, a dense date grove extends northward along the coast for about 2½ miles, at which distance from the village there is an almost bare sandy patch.

In 1932, H.M.S. *Fowey* anchored off the village, in a depth of 4½ fathoms ($8^{m}2$), with the fort at Ghālla bearing 280°, distant 4¾ cables, and in 1934, she anchored, in a depth of 5 fathoms ($9^{m}1$), with the fort bearing 279°, distant 6 cables.

About 3 miles northward of Ghālla and about 1½ miles inland, is Fujaira, a small town consisting of huts standing amongst date trees, which extend from the bare sandy patch to a position about one mile northward of the town. On a small hill north-westward of the town there is a prominent fort with towers. (*See* view facing page 54). Gharaifa, situated about one mile southward of the fort, is a small village of mat huts between the date grove and the coast.

Charts 2851, 2837.

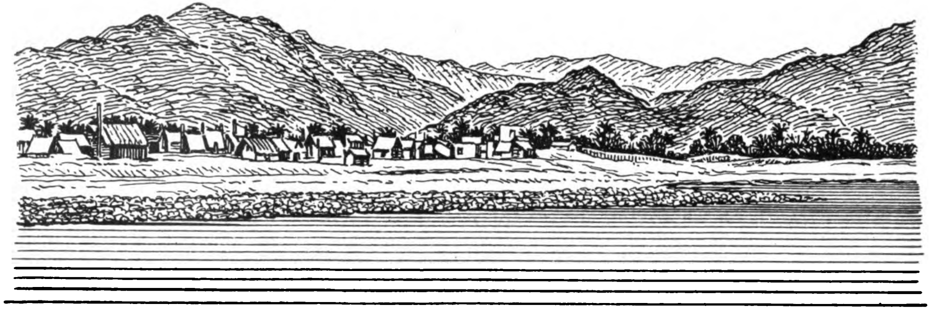
Anchorage may be obtained off Fujaira, in a depth of 5 fathoms ($9^{m}1$), about three-quarters of a mile offshore.

A shoal, over which there is a depth of 2 fathoms ($3^{m}7$), was reported by H.M.S. *Espiegle*, in 1910, in a position about 1½ miles offshore eastward of Fujaira; between the shoal and the coast there are depths of 5 fathoms ($9^{m}1$).

As Saqamqam, about 4 miles north-north-eastward of Fujaira, is a small village, the position of which may be identified by a round tower standing some distance inland. Close northward of As Saqamqam is a steep, black, rocky point between which and Khōr al Fākkān, about 11 miles northward, there are hills estimated to be from 1,000 to 1,500 feet ($304^{m}8$ to $457^{m}2$) high, conforming to the general topo-

Charts 2858, 748b.

To face page 57.



Khōr al Fākkān from eastward.

(*Original dated* 1914.)

Charts 2851, 2837.

graphy of the coast northward. It was reported in 1938, that the natives at As Saqamqam were friendly.

About 5 miles northward of As Saqamqam is the village of Murba, where it was reported, in 1938, that the natives were friendly.

Good anchorage may be obtained off As Saqamqam, in a depth of 7 fathoms (12^{m}8), about three-quarters of a mile offshore, with the tower bearing 266° and the fort at Fujaira bearing 188°.

Anchorage may be obtained eastward of Murba, in a depth of 10 fathoms (18^{m}3), about one mile offshore with the southern entrance point of Khōr al Fākkān bearing 000°.

Chart 3518, plan of Khōr al Fākkān.

Khōr al Fākkān.—Anchorages.—On the southern shore of this sandy bay is a village with a large date grove (*see* view facing this page). Immediately southward of the bay is a hilly projection, from 1,000 to 2,000 feet (304^{m}8 to 609^{m}6) high, off the north-eastern extremity of which lies Sīrat-al-Khor, a peaked islet about 240 feet (73^{m}2) high; the channel between the islet and the point is about 2 cables wide, with depths in it of about 18 feet (5^{m}5). Khōr al Fākkān is entered between this islet and Ras Luluiya, a rocky point, about 1½ miles north-westward.

Anchorage may be obtained, in a depth of 6 fathoms (11^{m}0), sand, about half a mile offshore north-north-eastward of the village, but it is open to the nashi.

It is reported that anchorage, which provides some shelter from the shamāl, may also be obtained, in a depth of about 4 fathoms (7^{m}3), in a position about 2 cables southward of Ras Luluiya (*Lat. 25° 22′ N., Long. 56° 22′ E.*).

About 3 cables eastward of the village and north-eastward of a cliffy point, on which stands a ruined tower, is the entrance to a small cove with a sandy beach at its head; there are depths of 18 feet (5^{m}5) in the entrance, and within it small boats can find sheltered anchorage.

A ruined tower, which, in 1948, was a prominent mark, stands, at an elevation of 268 feet (81^{m}7), about 4 cables southward of the village.

The natives, numbering about 2,000, in 1948, are nominally subjects of the Shaikh of Kalba, and were very friendly when visited by H.M.S. *Wren*, in that year. Small quantities of fruit and fresh vegetables may be obtained from a garden in rear of the village.

Chart 753.

Coast.—The coast for 4 miles northward of Ras Luluiya is low, sandy, and bordered with date groves, the mountains being only a short distance inland. Zubāra is a small village about 1¾ miles northward of Ras Luluiya. Al Badi, an islet, about 200 feet (61^{m}0) high, lies close offshore about 1¼ miles northward of Zubāra; on the coast, at a short distance northward of the islet, is a village of Al Badi.

Sharam, Dhadna, and Rūl Dhadna are three villages situated on the coast, respectively, about 2, 7¾, and 8¾ miles northward of Al Badi. This part of the coast consists of rocky points alternating with sandy bays, the mountains rising abruptly at a short distance inland.

Ras Dibba, about 2½ miles northward of Dhadna, is a projecting point consisting of cliffs of moderate height; about half a mile northward of the point is an islet, the depths in the intervening channel being about 12 feet (3^{m}7); there is a sand bluff on the cliffs about

Charts 2858, 748b.

Chart 753.

one mile westward of the point, which is prominent from northward but cannot be seen from eastward.

Dōhat Dibba.—Anchorage.—This bay is entered between Ras Dibba and Ras Suwat, a rocky point, to which slope down three spurs of the mountain range, situated about 6 miles north-westward; it is open from north-north-east to east, and the depths decrease regularly from 15 fathoms ($27^{m}4$), in the entrance, to the sandy beach.

The town of Dibba is situated at the head of the bay about 5 miles west-north-westward of Ras Dibba, and in it are two forts, only the southern of which can be seen from seaward. There are extensive date plantations in the valley southward of the town and all along the shore of the bay, which greatly obscure the view of the town from seaward. The Shaikh's fort, the southern one, is situated close to the beach in front of the date palms; it is small but prominent.

Anchorage was obtained by H.M.S. *Cyclamen*, in October, 1930, in a depth of about 5½ fathoms ($10^{m}1$), with the Shaikh's fort bearing 250°, distant 6½ cables. In 1931, H.M.S. *Penzance* anchored in a depth of 4 fathoms ($7^{m}3$), sand, with the fort bearing 230°, distant 4 cables.

Landing may be effected in fine weather on the sandy beach at the head of the bay.

The village of Al Karsha (*Lat. 25° 40′ N., Long. 56° 17′ E.*), about 2½ miles northward of the Shaikh's fort at Dibba, is in the district of Ruūs al Jibāl, the boundary running inland from a position between the two villages.

For the coast of Ruūs al Jibāl, *see* page 84.

Charts 2837, 2851, 2858, 748b.

CHAPTER III

APPROACHES TO THE PERSIAN GULF FROM EASTWARD—COASTS OF LAS BĒLA, MAKRĀN, AND PERSIAN MAKRĀN, INCLUDING JĀSK—CAPE MONZE TO JĀSK.

Chart 38.

COAST OF LAS BĒLA.—The coast of Las Bēla extends from the mouth of the river Hab (page 61), northward and north-westward for about 50 miles, and thence westward for about 125 miles to Khōr Kalmat. It is chiefly an uninhabited wilderness of hills and cliffs, at the foot of which are swamps or desert plains. Very few supplies can be obtained from the villages.

Caution.—Vessels navigating along the Makran coast between longitudes 61° 10′ E. and 66° 00′ E. should keep outside the 20-fathom ($36^{m}6$) line, and if obliged to close the land should do so with caution, sounding continuously. Charted depths are reported to be unreliable, owing to volcanic disturbances, in 1945.

Submarine exercise area.—A submarine exercise area has been established in a rectangular area the eastern side of which is defined, for all practical purposes, by a line drawn between positions 11½ and 26½ miles 151° from Cape Monze; the area extends about 8½ miles west-south-westward from this line.

Chart 61.

Cape Monze.—Light.—Off-lying dangers.—This cape (*Lat. 24° 50′ N., Long. 66° 39′ E.*), also known as Ras Muāri, is the western extremity of a sloping headland which rises to a pointed summit, with an elevation of about 460 feet ($140^{m}2$), about 17 miles westward of Manora point, at the entrance of Karachi harbour. *See* West Coast of India Pilot.

The Jhil range, an offshoot of the Kirthar range, is a ridge with a nearly level crest, but on which are some remarkable hummocks, the highest having an elevation of 776 feet ($236^{m}5$); it extends about 10 miles north-eastward from Cape Monze; for about the first 3 miles eastward of the cape, the hills slope down to the coast, but then turn inland and at about 5 miles farther eastward the coast becomes low. *See* view on chart 41.

A light is exhibited, at an elevation of 162 feet ($49^{m}4$), from a concrete tower, 168 feet ($51^{m}2$) in height, painted black and white in horizontal bands, situated on the coast about one mile south-eastward of Cape Monze.

The depths in the vicinity of Cape Monze are irregular, with the 3-fathom ($5^{m}5$) line approximately half-a-mile offshore. Nancowry shoal the inshore portion of a series of sand, gravel, and coral ridges, extends seaward from Cape Monze lighthouse in a south-westerly

Charts 41, 748b.

Chart 61.

direction, with patches of less than 36 feet lying as far as 2¼ miles offshore. Vessels when rounding the Cape should not close within 2½ miles of the coast. The 10-fathom (18^m3) line following the ridge contour extends nearly 3½ miles south-westward of the lighthouse.

Except for this ridge the 10-fathom (18^m3) line lies within one mile of the coast in the vicinity of the Cape.

Beauchamp reef, with depths of 39 feet (11^m9) over it, is a narrow ridge of shells and gravel, 1¼ miles long in a north-westerly and south-easterly direction, which lies about 3½ miles westward of Cape Monze (*Lat. 24° 50′ N., Long. 66° 39′ E.*), and over which the average depth is from 39 to 42 feet (11^m9 to 12^m8).

Two other shoals, with average depths over them of between 42 and 48 feet (12^m8 and 14^m6) sand and gravel, lie 3½ miles south-westward, and 2 miles west-south-westward of Churna island, respectively.

Churna island about 4 miles north-westward of Cape Monze and opposite the mouth of the river Hab is 586 feet (173^m6) high. From southward, its almost precipitous light coloured hills, appear to rise to a peak, but from westward it looks like a flat-topped hill with sloping sides. The island is steep-to, barren, and uninhabited, and is used as an air and sea bombardment target.

Between Churna island and the mainland, the depths are generally regular of between 6 and 9 fathoms (10^m9 and 16^m4) excepting for a ridge of gravel with depths between 5 and 6 fathoms (9^m1 and 10^m9), which extends north-eastward to the shore, and for some gravel patches, over which there are depths of from 28 to 36 feet (8^m5 to 11^m0), which extend about 1½ miles south-eastward from the island towards Cape Monze.

The island affords but little protection during the south-west monsoon, except for small craft anchoring close inshore.

On the northern side of Cape Monze (*Lat. 24° 50′ N., Long. 66° 39′ E.*) there is a small bay with a sandy beach, to which a valley descends between the Jhil range and some detached hills, about 555 feet (169^m2) high. The fishing village of Banglo is situated at the northern end of this bay. The seaward side of these hills which extend northward to the river Hab, is cliffy. The entrance to the river Hab is shallow, usable by small boats at high water only, with sand bars across its entrance which dry in places, and which extend for over half a mile seaward.

Southward of Cape Monze, in depths greater than 20 fathoms (36^m6), and eastward of it, in depths greater than 10 fathoms (18^m3), the bottom is everywhere soft.

Off-lying bank.—A bank, with a depth of 25 fathoms (45^m7) over it, was reported, in 1946, to lie about 87 miles south-south-westward of Cape Monze.

Chart 38.

Sonmiyani bay.—Dangers.—Sonmiyani bay is entered between Cape Monze and Ras Kacharī (Kuchar), about 60 miles north-westward. For 20 miles northward of Cape Monze the shore of the bay is indented between rocky points, thence north-westward and westward it becomes sandy and covered with low jungle, with sand hills in places.

Pab mountains rise on the northern bank of the river Hab, about 10 miles north-eastward of Cape Monze (*Lat. 24° 50′ N., Long. 66° 39′ E.*) and extend north-eastward and northward, gradually increasing

Charts 41, 748b.

Chart 38.

in elevation to over 3,000 feet ($914^{\mathrm{m}}4$). Westward of these mountains is a plain, about 35 miles wide, which extends to the foot of the Haro range. This plain is drained by the river Purali which flows through a swamp into the sea at the head of the bay. The Haro range, which is of light colour and irregular outline, trends north-north-eastward from the northern shore of the bay, and at its southern end attains an elevation of about 3,150 feet ($960^{\mathrm{m}}1$).

The village of Sonmiyani which is the seaport of Bēla, lies on the north-eastern shores of the lagoon which forms the entrance to the river Purali. The coast line is flat consisting of sand dunes, and the entrance to the lagoon is difficult to identify from seaward, the village not being visible owing to its drab appearance. Bēla, the capital of the State of Las Bēla, stands in the valley, about 65 miles by road northward of Sonmiyani.

The river Hab flows into the sea about 3½ miles north-north-eastward of Cape Monze. There is no fresh water within several miles of its mouth, except during freshets. The rocky hills on its southern side end about one mile within its mouth, above which there is a plain on each side of the river. The northern side of the entrance of the river is low, and a sandy spit extends nearly across the channel. A small isolated rocky hill stands on the northern side, a short distance inland.

The channel of the river Hab is tidal, and nearly dries; it has depths of 9 feet ($2^{\mathrm{m}}7$) at high water, and, usually, there are breakers across the entrance. The channel outside high-water mark shifts, but is practicable for a ship's boat. The tidal influence does not extend more than about 2 miles inside the mouth of the river.

For about 5 miles northward of the entrance to the river Hab the coast is low, with isolated rocks lying up to one mile offshore. 3 miles northward of the northern entrance point there is a low sandy point, from which rocks that dry extend about half a mile offshore. About 3 miles northward of this point is Chir Churna, a detached, square, rocky hill, about 100 feet ($30^{\mathrm{m}}5$) high, joined to the mainland by a low sandy isthmus.

A shoal over which there is a depth of 1¾ fathoms ($3^{\mathrm{m}}2$), lies about 1½ miles westward of the northern entrance point of the river Hab, and a shoal, with a depth of 3 fathoms ($5^{\mathrm{m}}5$), lies about 3½ miles northward of the same point. About 1½ miles farther northward, and about one mile offshore, is a sunken rock. There are depths of from 4 to 6 fathoms ($7^{\mathrm{m}}3$ to $11^{\mathrm{m}}0$) round both the 3-fathom ($5^{\mathrm{m}}5$) shoal and the sunken rock.

A low rocky islet lies about three-quarters of a mile north-westward of Chir Churna, with depths of 7 fathoms ($12^{\mathrm{m}}8$) close seaward of it, and 5 fathoms ($9^{\mathrm{m}}1$) between it and the land.

Within a distance of about 6 miles north-north-eastward of Chir Churna are three small bays separated by high rocky points. Inland of the southernmost of these bays are backwaters, one of which has an entrance close eastward of Chir Churna; from these backwaters, the ground rises abruptly to the southern part of the Pab range. For 3 miles northward of Chir Churna the coast is hilly, thence to the entrance of Sonmiyani lagoon, about 22 miles north-north-westward of Chir Churna (*Lat. 25° 01′ N., Long. 66° 41′ E.*), the coast is bordered by sand hillocks covered with tufts of grass and small bushes.

Chart 748b.

Chart 38.

Sonmiyani Lagoon.—The entrance to this lagoon lies between two low sandy points 2 miles apart.

There are several entrance channels with varying depths, the deepest, which lies close to the eastern shore having depths of up to 5 fathoms ($9^{m}1$). All these channels however are blocked by a shoal flat, that dries in places, which extends right across the entrance, and for 2 miles seaward. The maximum depth across this bar is 5 feet ($1^{m}5$). During the south-west monsoon the seas break heavily right across the lagoon entrance. Within the entrance the channel depths fluctuate, there being no true channel leading to the village. The lagoon is generally shallow with sandbanks that dry, its northern shores merging into extensive mangrove swamps.

The eastern entrance point is composed of sandy hillocks, thinly covered with tamarisk bushes, and between it and the town is a mud flat, which mostly dries, and over which the river Windar (Vindar), flowing south-westward, discharges during floods.

The western entrance point consists of low bare sand hills.

Westward of the harbour is a vast swamp, which extends within the coastal sand hills almost to the foot of the Haro range, and at high water is partly covered. During heavy rains, the river Purali discharges into the northern part of the swamp, though, being dammed about 20 miles inland, its waters are usually absorbed in irrigation.

The harbour is only used by native craft. Vessels wishing to communicate should anchor off the bar, in a depth of not less than 5 fathoms ($9^{m}1$), with Churna island bearing about 173°

Northern shore of Sonmiyani bay.—Anchorage.—The northern shore of Sonmiyani bay from the western entrance point of Sonmiyani lagoon is low with sand hillocks, on which are tufts of grass, to the Haro range, about 24 miles westward, whence again it is low to Chandragup (Darya cham), 13 miles farther westward. The depths offshore are regular, and the coast can be approached into a depth of 6 fathoms ($11^{m}0$), there being depths of 3 fathoms ($5^{m}5$) from one to 2 miles offshore.

The river Phor (Pur) enters the sea about 33 miles westward of Sonmiyani lagoon; its mouth is a small salt-water creek, into which during the rains, flows the river which drains the valley westward of the Haro range.

Anchorage can be obtained, in a depth of 5 fathoms ($9^{m}1$), in the bay westward of the mouth of the river Phor, but a depth of 3½ fathoms ($6^{m}4$) lies about 2½ miles offshore, about 6 miles south-westward of the mouth of the river.

Chandragup (*Lat. 25° 27′ N., Long. 65° 50′ E.*), the eastern of a detached group of low hills near the middle of the southern part of a plain extending about 30 miles westward from the Haro range, is situated about 2 miles inland, 4½ miles west-north-westward of the mouth of the river Phor; it consists of several white conical hillocks, the highest of which attains an elevation of about 300 feet ($91^{m}4$).

Ras Kacharī is the south-eastern extremity of some low cliffs, above which rise the detached group of hills, of which Chandragup is the easternmost.

Tidal streams.—In Sonmiyani bay, the tidal streams are weak and set eastward on the rising tide, and westward on the falling tide, following the curve of the land.

Chart 748b.

Chart 38.

Coast.—Aspect.—Danger.—Between the Haro range and Ras Malān, about 30 miles westward of Ras Kacharī, the coast appears from seaward as a succession of rugged mountains, generally of light colour, with lower whitish-clay peaks, called " shur " by the natives, in front of them. Jabal Hinglāj, about 20 miles west-north-westward of Ras Kacharī, and 8 miles inland, is about 3,720 feet (1133^{m}9) high, and wedge-shaped (*see* view on chart 38). Gurangatti (Gorangati), 8 miles farther west-north-westward, with a valley between, is a remarkable square-topped mountain, about 3,900 feet (1188^{m}7) high, resembling a castle with bastions, its sides appearing almost vertical. From Jabal Hinglāj, Jabal Halā (Hara), a range, of irregular outline and with lower hills in front, trends east-north-eastward from 8 to 12 miles inland, until about 5 miles from the Haro range, where it turns north-north-eastward, parallel with the latter.

Westward of Ras Kacharī, the coast is low. Jabal Ghurāb, situated near the coast about 2½ miles westward of Ras Kacharī, is small and oblong.

A shoal bank extends about 2½ miles offshore in the vicinity of Jabal Ghurāb, with depths of 6 fathoms (11^{m}0) close to its outer edge.

Jazīrat Chahārdam, off the coast about 3 miles westward of Jabal Ghurāb, consists of some rocks from 20 to 30 feet (6^{m}1 to 9^{m}1) high, and somewhat higher than the coast in the vicinity; there is good landing for a boat inside these rocks. For about 12 miles westward of the rocks as far as Jabal Hab, a ridge of hills, about 250 feet (76^{m}2) high, slopes down to the coast and forms a small point about 2 miles farther westward.

A small island, composed of volcanic mud, was observed, in December, 1945, about 3 miles south-westward of Ras Chahārdam.

In February, 1947, this island had submerged.

The river Hingol (Hingor), the mouth of which is situated about 2 miles eastward of Jabal Hab, can be entered at high water by small craft with a draught of 6 feet (1^{m}8). The river, the bed of which dries in many places, brings down quantities of driftwood during freshets; it winds round the eastern side of Jabal Hinglāj, and through a gap in Jabal Hab. Eastward of the river, the plain within the coastal sand hills is swampy after rain.

Westward of Jabal Hab, low sand hills border the coast for about 12 miles to the cliffs of Ras Malān (*Lat. 25° 19′ N., Long. 65° 13′ E.*).

Ras Malān, about 14 miles west-south-westward of Jabal Hab, is a prominent bluff with a steep face on its seaward side and a level summit of clay capped with limestone. The highest part, about 4 miles northward of the bluff, attains an elevation of about 2,050 feet (624^{m}8), with cliffs rising to it abruptly from the sea, there being no beach. Great masses of clay, detached from the mountain side, frequently fall. From seaward, the bluff appears as a long light-coloured tableland ending in cliffs; between it and Jabal Hinglāj is a confused mass of lower hills and shur. There is a depth of 4 fathoms (7^{m}3) about one mile south-eastward of the bluff. The locality is uninhabited.

Anchorage.—Anchorage may be obtained in the bay eastward of Ras Malān, in a depth of about 4 fathoms (7^{m}3), about one mile offshore, with Gurungatti bearing about 000°, and Ras Malān bearing 230°, but the depths appear to shoal close inshore of this position.

Chart 748b.

Chart 38 and plan of Ormāra East bay.

Coast.—For a distance of about 19 miles westward of Ras Malān the coast is cliffy; thence it is low, sandy and fronted by low sand hills, from 10 to 45 feet ($3^{m}0$ to $13^{m}7$) high, on which are tufts of grass, for about 15 miles to the isthmus of Ormāra, with a plain inland. The high land westward of Ras Malān, known as Batt, is intersected 7 miles from the point by the Hor Batt, a salt-water lagoon, with a sandy bar between it and the sea, into which a great water-course runs through a gorge in the mountains. The mountains become lower westward of the lagoon.

The plain westward of Batt extends about 10 miles inland to the Tālo (Tallu) hills, a range running eastward to Gurangatti in several ridges nearly parallel with the coast. On this plain, northward of the eastern extremity of Ras Ormāra, and 4 miles inland, is Chandra kūp, a conspicuous white cone, about 190 feet ($57^{m}9$) high, with a mud crater. In certain lights this hill appears to be dark, and with strong winds may be obscured by sand storms.

A group of about 12 small white mud volcanoes, of which the highest is 105 feet ($32^{m}0$) high, is situated about 2 miles eastward and a single mud volcano, 65 feet ($19^{m}8$) high, about the same distance westward of Chandra kūp (*Lat.* 25° 21′ *N.*, *Long.* 64° 40′ *E.*).

Khōr Maniji, 20 miles westward of Ras Malān, is shallow, but, for a short time after rains, it becomes the mouth of a small river. Khōr Gurād, about 5 miles farther westward, is similar; both are visited by native boats.

Chart 38, plan of Ormāra East bay.

Ras Ormāra.—Dangers.—Ras Ormāra is the south-western extremity of a mountainous peninsula is 1,575 feet ($480^{m}1$) high. From the summit the peninsula slopes gently eastward and southward, and ends on all sides in cliffs; from southward, it appears wedge-shaped. It is of similar geological formation to the other ranges on the coast, and is only accessible from southward where several valleys break the line of cliffs. The sandy isthmus, connecting the middle of the peninsula with the mainland, extends about 3½ miles southward from the coast; on its southern part is the village of Ormāra. Northward of the village, in the middle of the isthmus, there are sand dunes, from 20 to 60 feet ($6^{m}1$ to $18^{m}3$) high, which change shape in strong winds, but the beach on each side is low. Two rocks were reported, in 1921, to lie about 3½ cables south-westward of Ras Ormāra.

An 18-foot ($5^{m}5$) patch lies about half a mile south-eastward of the eastern extremity of the peninsula.

Two narrow rocky ridges, named Rodrigues shoal, with depths of from 18 to 27 feet ($5^{m}5$ to $8^{m}2$) over them and a gutter between them, lie from 1¾ to 4¼ miles eastward of the eastern extremity of the peninsula, and, in 1948, were reported to extend about 6 miles farther eastward, with depths of 30 to 42 feet ($9^{m}1$ to $12^{m}8$) over them. A passage between Rodrigues shoal and the peninsula, about one mile wide, has been swept to a depth of 27 feet ($8^{m}2$).

The village of Ormāra, situated on the eastern beach of the isthmus, about one mile from the cliffs, consists of a few stone houses and mosques, and some mat huts.

Ormāra is the centre of a shark fishing industry.

Anchorages.—Dīmi zar (East Bay) on the eastern side of the isthmus of Ormāra, is the usual anchorage. The depths shoal regu-

Chart 748b.

Chart 38; plan of Ormāra East bay.

larly in the bay, which has a bottom of sand and mud except near the cliffs where there are rocks. Anchorage may be obtained, in a depth of 24 feet ($7^{m}3$), about 3½ miles from the village, with the eastern extremity of the peninsula (*Lat. 25° 10′ N., 64° 37′ E.*) bearing 177° and the prominent red-roofed radio office, about one mile westward of the village, bearing 249°; light draught vessels can anchor in a depth of 15 feet ($5^{m}5$) closer in. The bank off the south-western part of the bay dries for about one mile offshore; the most suitable place for landing is near the southern end of the sand dunes northward of the village, and about 6 cables northward of a small white dome; here, boats drawing 5 feet ($1^{m}5$) can approach to within half a cable of the shore at half tide.

Chandra kūp, bearing 345°, leads through the swept passage between the peninsula and Rodrigues shoal, in a depth of not less than 27 feet ($8^{m}2$), and into the bay.

The bay is open to easterly winds, which may blow strongly. During the South-west monsoon there is usually at least one blow from eastward, with rain, which is not of long duration; Padi zar is then the best anchorage, though communication with the shore is more tedious. Native craft appear always to ride out these breezes. In the South-west monsoon, and at any time after April, a long swell sets round the point into Dīmi zar, raising a surf on the beach and causing vessels at anchor to roll heavily.

The tidal streams in the bay are weak, and set north-eastward and south-westward following the curve of the land.

Padi zar (West bay), on the western side of Ormāra isthmus, is entered between Ras Ormāra and the high cliffs of Ras Sakanni, about 8 miles west-north-westward. The shores are low and sandy; at its head, and about 5 miles from the village, is a small, square, rocky hill near the coast, which is about 100 feet ($30^{m}5$) and conspicuous. The bay is seldom visited, being open south-westward and westward. There are depths of less than 18 feet ($5^{m}5$) within 3 miles of the eastern and northern shores of the bay. There is anchorage in Padi zar with the western extremity of the peninsula bearing about 180°.

Chart 38.

Coast.—Between Ras Sakanni and Ras Basōl (Basul), about 10 miles west-north-westward, the coast is bordered by continuous cliffs, about 800 feet ($243^{m}8$) high, of light colour and irregular outline, without any marked peak; the cliffs are the sea face of the Kāmgar hills, between which and the Tālo hills, there is a wide plain. Ras Basōl lies at the western end of these cliffs. The bay which is entered between Ras Basōl and Khōr Kalmat, about 10 miles west-north-westward, is shallow, with a low sandy shore.

About 2 miles north-westward of Ras Basōl is the mouth of the river Basōl; this river flows from the interior between the Tālo and Tālār ranges; the land in the vicinity of its mouth, is swampy and very low.

The Tālār hills trend east-north-eastward from about 10 miles north-westward of the entrance of Khōr Kalmat, and approach the western part of the Tālo hills (*Lat. 25° 30′ N., Long. 64° 45′ E.*).

Two islands, composed of volcanic mud, were situated, in 1945, about 6 miles south-south-westward and 7 miles southward, respec-

Chart 748b.

Chart 38.

tively, of Ras Basōl; when first observed they were, respectively, about 7½ cables and 1½ miles in length, and from 20 to 30 feet (6^m1 to 9^m1) and 60 to 100 feet (18^m3 and 30^m5) high; about 10 days later these islands were about one cable and 1½ cables in diameter, and 47 and 32 feet (14^m3 and 9^m8) high.

In February, 1947, these two islands had submerged.

In Khōr Kalmat, the largest inlet on the coast, there are depths of 5 and 6 fathoms (9^m1 and 11^m0); it is of considerable width, but on the bar there is a depth of only 2 feet (0^m6). The entrance is rendered difficult by rocks lying upwards of one mile outside the bar, and the tidal streams in the entrance are strong. The land near the entrance is very low, with mangrove swamps. Native craft of 9 feet (2^m7) draught are reported to enter the inlet by the eastern of the two channels over the bar. Inside the bar there are depths of from 4 to 7 fathoms (7^m3 to 12^m8). At some distance inside the inlet are four creeks, which, beyond the range of the tides, form the mouths of water-courses.

Tad, situated on the western side of the khōr, contains a few houses, the only permanent habitations in the neighbourhood.

COAST OF MAKRĀN.—The coast of Makrān extends in a general westerly direction from Khōr Kalmat (*Lat. 25° 19′ N., Long. 64° 04′ E.*) to the frontier of Persian Makrān, a distance of nearly 140 miles. Very few supplies can be obtained from the villages.

For "*caution*" referring to volcanic disturbances, *see* page 59.

For 12 miles westward of Khōr Kalmat the coast is low, the coastal bank, with depths of less than 3 fathoms (5^m5), extending about 3 miles offshore; thence, gradually becoming higher, the coast is backed by continuous ridges of shur which extend as far westward as the barren northern shore of Pasnī bay where they attain a height of nearly 1,000 feet (304^m8). There are some outlying rocks off the north-eastern side of the bay and a rocky spit, with depths of less than 3 fathoms (5^m5) over it, extends about half a mile eastward from Ras Jaddī, the western entrance point.

Shādi khōr is a large, shallow creek with sandy banks, the entrance to which is situated about 1½ miles northward of Pasnī. The mouth is encumbered with drying banks and is protected on its southern side by a narrow sandy ridge; the khōr can only be entered by boats around high water.

Off-lying island and dangers.—Astola island, about 2 miles long and half a mile wide, situated about 19 miles east-south-eastward of Ras Jaddī, is 260 feet (79^m2) high at its western end, table-topped and bordered by cliffs all round. The cliffs consist of soft clay, rubble and iron stone conglomerate and are vertical, except on the northern side of the island, where, about the middle, a sand spit extends about 3 cables seaward, and towards the north-western corner, where there is a small boat harbour.

Rocky ledges extend for about 4 cables from both ends of the island and there are some detached above-water rocks along the southern side extending about 2 cables offshore. Astola is covered with small scrub and at certain seasons of the year abounds with small venomous snakes, called "gar" by the natives.

The island is a place of pilgrimage for the Hindus and Pasnī Meds,

Chart 748b.

Chart 38.

who land at the north-eastern point of the island, whence the ascent is steep and tortuous.

The island is visited by fishermen during the north-east monsoon, but is otherwise uninhabited.

Webb bank lies about 3½ miles southward of Astola island and extends about 7 miles eastward and westward; it is a narrow ridge, steep-to on its southern side, with irregular depths of from 4 to 9 fathoms ($7^{m}3$ to $16^{m}5$) in the channel between it and the island. There are depths of from 3 to 5 fathoms ($5^{m}5$ to $9^{m}1$) over the bank and a least known depth, in 1950, of 12 feet ($3^{m}7$), situated about 4½ miles south-south-eastward of the eastern extremity of Astola (*Lat. 25° 06′ N., Long. 63° 56′ E.*); the sea breaks on the bank in places during the south-west monsoon and vessels approaching Pasnī from south-eastward should not close Astola within a distance of 5 miles. Depths of 5½ and 5 fathoms ($10^{m}1$ and $9^{m}1$), which, in 1950, were unexamined, lie about 8 miles east-south-eastward and 6 miles south-westward of the eastern extremity of Astola. Gurāb (Sail rock) lies 7 cables southward of the middle of the southern side of Astola island; it is 20 feet ($6^{m}1$) high, steep-to, and appears like a boat under sail; vessels should not pass between the rock and the island.

Depths of less than 3 fathoms ($5^{m}5$), extend about one mile northward from the northern side of Astola, but in the channel between this and the mainland northward there are regular depths of from 5 to 8 fathoms ($9^{m}1$ to $14^{m}6$).

Breakers were observed, in 1922, in two positions about 6 miles westward of Webb bank. A wide berth should, therefore, be given to this locality.

Pasnī.—Anchorage.—Pasnī, situated on the low western shore of the bay about 3 miles northward of Ras Jaddī, is of considerable importance owing to its proximity to Turbat, the headquarters of the Makrān administration, situated about 50 miles north-north-westward, with which it is connected by a bus service.

This small port, which has several thousand inhabitants, straggles inland for several miles and consists mainly of clay and mat huts with a few permanent buildings. The post and telegraph office, a large white building, about half a mile northward of the town, is a good mark. There are no landing facilities.

It is the seaport of Kulānch, a district of Makrān, extending about 120 miles westward from Khōr Kalmat, and is the headquarters of the Nāib of Kulānch.

With the exception of a few date palms southward of the town, there is no vegetation in the neighbourhood; south-westward of the town is a mass of high white sand hills, and northward of these, are a number of shur.

Dried fish and dates are the principal exports with small quantities of wool, ghee, cotton and mats. General merchandise and white oils are imported. Trade is principally by dhow, but steamships on passage from the Persian gulf occasionally call.

The depths in the bay decrease regularly towards the shore, the 3-fathom ($5^{m}5$) line being about 2 miles offshore, except off Ras Jaddī where it is closer.

Anchorage may be obtained, in a depth of about 3½ fathoms ($6^{m}4$), sand, more than 2 miles offshore, with the town bearing 270°, and

Chart 748b.

Chart 38.

Ras Jaddī about 194°, or farther out in depths of 4 fathoms (7^{m}3).

During the south-west monsoon a considerable swell runs into the bay, Ras Jaddī (*Lat. 25° 13′ N., Long. 63° 29′ E.*) giving little protection, and from April to September a heavy swell breaks along the shore, making the working of cargo difficult and often impossible.

Climatic table.—*See* page 29.

Coast.—Between Ras Jaddī and the point about 1½ miles southward, on which is Jabal Zarain, is a small bay, about 1½ cables inland of which is a group of clav hills of fantastic shape, about 150 feet (45^{m}7) high.

Jabal Zarain is about 400 feet (121^{m}9) high, brown in colour, and remarkable; its shape is similar to that of a barn, especially when seen from westward or eastward; from southward, it appears as a long notched ridge with sloping ends; from a distance, it appears detached as the land round it is low; it is steep-to, and there are depths of from 4 to 5 fathoms (7^{m}3 to 9^{m}1) about one mile offshore. *See* view on chart 38.

Between a point about 10 miles westward of Jabal Zarain, and Ras Shamāl Bandar, 13 miles westward, the coast, which forms a bay, is low and the coastal bank extends about 1½ miles offshore. Small vessels sometimes take shelter from westerly winds in the western part of the bay. The coast appears to be bordered by desert, but a short distance inland it is fertile in places.

Chakūli kūh, a range of mountains about 1,400 feet (426^{m}7) high, is a westerly continuation of the Tālār hills and lies, parallel with the coast, from 8 to 10 miles inland; the western part, separated from the eastern by the river Save (Sawur), is known as Kūh-e Darām (*see* below).

Ras Shamāl Bandar is a bluff, and is the first high land near the coast westward of Jabal Zarain; it should not be approached into depths of less than 6 fathoms (11^{m}0), as a reef, the outer edge of which is steep-to, extends about one mile offshore.

Ras Shāhid (*Lat. 25° 12′ N., Long. 62° 59′ E.*) lies about 5½ miles west-south-westward of Ras Shamāl Bandar; the coast between these two points and also between the former and Ras Kappar, about 13½ miles westward, rises to a long jagged ridge of precipitous, white, clay hills, from 400 to 500 feet (121^{m}9 to 152^{m}4) high, a short distance inland, with low ground behind them; except in a few places, at low water there is no beach on this stretch of coast. Between 6 and 9 miles westward of Ras Shāhid, there are three gaps in the hills, through one of which the river Save flows into a large salt-water creek.

Ras Kappar (Kapar) is the southern extremity of a table-topped hill with bluff ends, about 640 feet (195^{m}1) high, situated at the western end of, and partly detached from, the hills extending westward from Ras Shāhid. There are depths of 3 fathoms (5^{m}5) about 3 cables from the point. Kappar is a small village close to the coast near the point.

Mukh, about 17 miles north-westward of Ras Kappar, is a prominent peak about 2,920 feet (890^{m}0) high, and Bārn, the summit, 5 miles eastward of it, is about 3,150 feet (960^{m}1) high. Lower clav hills rise in front of these mountains.

Dimak kūh, 6 miles westward of Ras Kappar, and a short distance inland, is small, of darker colour than the other hills in the locality, and has several little paps on its summit.

Chart 748b.

Chart 38.

Between Ras Kappar and the point on which lies Jabal Sur (Sar), about 15 miles westward, the coast is sandy and rises to low hills, principally shur; between Jabal Sur and the mainland northward of it there is a small sandy bay. The coastal bank between Ras Kappar and Jabal Sur extends from half a mile to one mile offshore. The river Karawat, about 9 miles westward of Ras Kappar, is only a small stream, and is the eastern boundary of the Gwādar territory.

Kūh-e Darām is a range of mountains lying parallel with the coast about 12 miles inland, decreasing in height westward, where it ends abruptly in Gar-e kūh (Garr), a remarkable notch or rather two great vertical steps descending from an elevation of about 1,490 feet ($453^{m}2$) about 20 miles west-north-westward of Jabal Sur, and forming a good landmark. A wide plain extends from the foot of Kūh-e Darām to Jabal Medhdī (page 115), and to the root of the isthmus of Gwādar; in this plain, which is cultivated, are some scattered villages.

Kūh Sajidi (Saiji) is the summit of a mountain range, extending eastward and westward about 20 miles inland, which attains an elevation of about 3,120 feet ($951^{m}0$).

Chart 38, plan of Gwádar bay.

Jabal Sur (Sar) (*Lat. 25° 13′ N., Long. 62° 28′ E.*) is a small, wedge-shaped, white, clay hill, about 510 feet ($155^{m}4$) high, rising steeply with a vertical cliff at its eastern end; the isthmus connecting it with the mainland is low and sandy. *See* view on chart 38.

Jabal Mehdī (Mahdi), a precipitous white clay ridge with vertical cliffs on its southern side, rises abruptly from the plain at the root of the isthmus and extends about 4 miles westward from a position about 2 miles westward of Jabal Sur, the land between Jabal Sur and Jabal Mehdī being low. The outline of the ridge is very remarkable; the highest peak, about 1,340 feet ($408^{m}4$) high, is in the form of a sugar-loaf, the Asses' ears, 2 miles westward, is a curious double peak, a few feet lower than the summit. From eastward, this ridge, as also Jabal Sur and the peninsula appear detached. *See* view on chart 38.

Gwādar.—The town of Gwādar is situated on a low, narrow, sandy isthmus, which connects a rocky peninsula with the mainland. On the eastern and western sides, respectively, of this peninsula are Gwādar East bay and Gwādar West bay.

The peninsula is faced on all sides with cliffs and its summit slopes down from the highest bluff, which is about 480 feet ($146^{m}3$) high and is situated at the southern end of the western side of the isthmus. *See* view on plan on chart 38.

Ras Nūh, the eastern extremity of the peninsula, is a bluff about 280 feet ($85^{m}3$) high, about 8½ miles south-westward of Jabal Sur. A temple stands close to the edge of the cliff, at Ras Nūh. With its high white bluffs, the peninsula is prominent from eastward and then appears as a wedge-shaped island; from southward and south-westward it is not so remarkable, but appears darker in colour than the land behind it. *See* view on chart 38.

Bandar Hairān, about three quarters of a mile south-westward of Ras Nūh, is a small bay frequented by fishing boats; the cliffs in the vicinity of the bay are low and the beach is of sand.

Ras Kamaiti (Kamiti), the western extremity of the peninsula, is a cliff about 70 feet ($21^{m}3$) high. A small white tomb on the southern

Chart 748b.

Chart 38, plan of Gwádar bay.

edge of the cliff, about half a mile eastward of Ras Kamaiti, is prominent from southward when the sun is shining on it.

A rocky spit, with a depth of 4 fathoms ($7^{m}3$), extends about 9 cables southward from a low rocky point about a quarter of a mile southward of Ras Nūh (*Lat. 25° 06′ N., Long. 62° 23′ E.*).

Directions.—Tidal streams.—A vessel approaching from eastward should keep in depths of from 10 to 15 fathoms ($18^{m}3$ to $27^{m}4$); even if the weather is hazy, it would scarcely be possible to pass the rocky peninsula in these depths without seeing it.

A vessel approaching from westward should not get into depths of less than 12 fathoms ($21^{m}9$) until Ras Nūh bears less than 350°, particularly in hazy weather.

There is usually a ripple over the rocky spit and, during the Southwest monsoon, it is marked by breakers. There is a depth of 5 fathoms ($9^{m}1$) about 3 cables eastward of Ras Nūh.

In hazy weather vessels not bound to Gwādar should keep in depths greater than 20 fathoms ($36^{m}6$).

At night a good look-out should be kept for fishing boats and canoes with their nets out.

The tidal streams off the rocky peninsula set eastward and westward, and, their rate is reported to be hardly perceptible, H.M.S. *Crocus*, in June, 1927, experienced an east-going current of about 4 knots off Ras Nūh (*Lat. 25° 06′ N., Long. 62° 23′ E.*), at about one hour before high-water by the shore, but this was probably due to meteorological causes.

Gwādar East bay.—Dangers.—Gwādar East bay is entered between Jabal Sur and Ras Nūh. Except on the northern side of the headland its shores are low and sandy. A flat, over which there are depths of about 2 fathoms ($3^{m}7$), extends from one to 2½ miles from the eastern side of the isthmus. It was reported, in 1934, that erosion of the isthmus is continual and that shoaling was taking place in the bay. Shoals, with depths of 3, 3¼ and 5¼ fathoms ($5^{m}5$, $5^{m}9$ and $9^{m}6$) over them, lie about 1¼ miles northward, 1¼ miles north-north-eastward and 1½ miles north-eastward, respectively, of the temple on Ras Nūh.

The bay is well sheltered from south-westerly winds, but during the South-west monsoon, the long swell rounding Ras Nūh causes vessels at anchor to roll heavily. During easterly winds, communication with the shore is sometimes difficult, but these winds are seldom strong enough to endanger a vessel; during the continuance of such winds a steam vessel might obtain shelter in Gwādar West bay. *See* page 71.

A boat harbour is formed by a projecting cliffy point, at the southern end of the bay, on the northern side of the peninsula about 1½ miles westward of Ras Nūh.

There is no proper landing place either in Gwādar East bay or Gwādar West bay, the boats being hauled up on the shelving beach.

Anchorage.—Directions.—Anchorage may be obtained in Gwādar East bay with the telegraph office at Gwādar bearing between 262° and 250° as close in as the draught of the vessel will permit; the closer the better, both to facilitate communication with the town and to obtain smoother water.

Approaching from southward or westward, from a position about 4 miles southward of Ras Nūh, with the western end of Jabal Mehdī

Charts 2858, 748b.

Chart 38, plan of Gwádar bay.

ridge bearing less than 348° and open eastward of Ras Nūh, a vessel should steer for the eastern peak of the ridge, bearing less than 005°, until Ras Nūh is abeam, whence she should steer for the anchorage as convenient, taking care to avoid the shoals northward and northeastward of Ras Nūh (*Lat. 25° 06′ N., Long. 62° 23′ E.*), previously mentioned.

Town.—Gwādar is situated near the southern end of the sandy isthmus connecting the peninsula with the mainland. Most of the dwellings are mat huts, but a number of mud and stone buildings, amongst which is a prominent mosque, are grouped round a square fort with a high tower. Northward of the town is the telegraph office, a large block of buildings, and about half a mile farther northward is the Wali's fort with its flagstaff, which must not be mistaken for the telegraph office. The fort is a large white square building, prominent either from eastward or westward. The flagstaff stands on the south-eastern corner of the roof and its truck is elevated about 100 feet ($30^{m}5$). About midway between the Wali's fort and the telegraph office are two radio masts, each 70 feet ($21^{m}3$) in height, but they are not remarkable from eastward or westward as they are partially obscured by trees. In the vicinity of the town, there are a few date palms and banyan trees.

The town and district, the coast of which latter extends from the mouth of the river Karawat to the neighbourhood of Ras Pīshūkān (*see* below), is administered by an Arab Wali representing the Sultan of Muscat.

Consul.—A British Consular Officer resides at Gwādar.

Gwādar West bay.—Anchorage.—This bay is entered between Ras Kamaiti and Ras Pīshūkān (Pishkán), about 10 miles westward. A spit extends about half a mile southward from Ras Kamaiti, but the north-western side of the point is fairly steep-to; a bank, with depths of less than 3 fathoms ($5^{m}5$), extends nearly 2½ miles offshore on the western side of Gwādar isthmus, which latter forms the eastern shore of the bay.

A small island of volcanic mud, was situated, in January 1946, about 4½ miles northward of Ras Kamaiti. In February 1947, it was about half a cable long.

Ras Pīshūkān (*Lat. 25° 06′ N., Long. 62° 05′ E.*) consists of narrow rocky cliffs about 20 feet ($6^{m}1$) high, with a rocky spit, on which the sea breaks, extends about 3½ cables south-eastward from it. The headland is reported to be the western limit of Gwādar territory, but the frontier has not been permanently defined.

With the exception of Toshdān kūh, a small range of low hills on the coast about 7 miles northward of Ras Pīshūkān, near which there is a fort, the shores of the bay are low.

Khōr Akāra (Ankara) is a small stream at the head of the bay eastward of Toshdān kūh, and in its vicinity the land is marshy.

The small village of Pishūkān is situated on the western side of the bay about 4 miles north-north-westward of Ras Pīshūkān.

Anchorage may be obtained in Gwādar West bay, about 2¾ miles offshore, in a depth of 4 fathoms ($7^{m}3$), sand, with Ras Kamaiti bearing 198°, and the telegraph office at Gwādar bearing, 090°; or, on the western side of the bay, in a depth of 4 fathoms ($7^{m}3$), with Ras Pīshūkān bearing 182°, distant about 3 miles.

Charts 2858, 748b.

Chart 38, plan of Gwádar bay.

Coast.—Light.—The coast for 12 miles westward of Ras Pīshūkān is low, and thence for about 4 miles southward, to Ras Ganz (Gunz), it consists of a succession of rocky, cliffy points separated by sandy beaches.

Bandar Ganz entered between Ras Pīshūkān and Ras Ganz, affords shelter, during westerly winds, to small vessels, in depths of from 3 to 4 fathoms ($5^{m}5$ to $7^{m}3$), about one mile offshore.

Ras Ganz is of light colour and about 200 feet ($61^{m}0$) high; it is the bluff eastern point of a promontory, and is a good mark from westward but not so from eastward.

Ganz is a small village of mat huts on the coast about 4 miles northward of Ras Ganz; a small whitewashed mosque is the only permanent building.

A light, for the use of aircraft, is exhibited, at an elevation of 30 feet ($9^{m}1$), from a beacon on a tower situated about 4 miles north-north-eastward of Ras Ganz. *See* page 15.

A promontory, about 440 feet ($134^{m}1$) high, named Katāgar, separates Bandar Ganz from Gwātar bay; its southern side, of which Ras Jīwani (Jiyūni), about 100 feet ($30^{m}5$) high, is the western extremity, is an almost unbroken line of cliff, interspersed at its foot with sandy beaches. Ras Garnān (*Lat. 25° 01′ N., 61° 45′ E.*), about 2 miles eastward of Ras Jīwani, is about 20 feet ($6^{m}1$) high, and projects about half a mile southward beyond the line of the higher cliffs.

Remarkable hills with rugged peaks, and amongst which are pillars of clay, rise a short distance inland and extend nearly to the river Dasht (page 74); northward of these hills is the great plain or valley of the Dasht.

The bottom off the promontory of Katāgar is very uneven in depths of less than 10 fathoms ($18^{m}3$).

Chart 38, with plan of Gwatar bay.

Gwātar bay and approaches.—Dangers.—Gwātar bay is entered between Ras Jīwani (Jiyūni) and Ras Fāsteh (Fastā), about 15 miles west-north-westward. A spit, which appears to dry, extends about one cable westward from the western side of Ras Jīwani.

The gradual decrease of soundings towards the coast southward of Gwātar bay is a useful guide to a vessel approaching at night or in thick weather. The bottom consists of white clay, very tenacious and gritty. After heavy rain, the water in the bay and its approaches becomes discoloured, and much drift wood is seen. In 1915, the depths in the bay were reported to have shoaled.

A shoal patch, over which there is a depth of 6 fathoms ($11^{m}0$), was reported by H.M.S. *Sphinx*, in 1891, to lie about 3½ miles south-eastward of Ras Jīwani.

A shoal, over which there is a depth of 2½ fathoms ($4^{m}6$), rock and sand, lies about 1½ miles south-eastward of Ras Jīwani, and there are depths of 7 fathoms ($12^{m}8$) between it and the coast.

A shoal, over which there is a depth of 2 fathoms ($3^{m}7$), lies about one mile westward of the north-western extremity of Ras Jīwani, and a shoal, with depths of from 4 to 5 fathoms ($7^{m}3$ to $9^{m}1$), lies about 2 miles west-south-westward of the same point; for about 2½ miles northward of the point, a reef extends about half a mile offshore. There are several shoal patches northward of the 2-fathom ($3^{m}7$) shoal, and depths of less than 3 fathoms ($5^{m}5$) were reported, in 1921, within about 1¼ miles of the coast northward of Ras Jīwani.

The eastern shore of the bay is cliffy for about 3½ miles northward of Ras Jīwani, beyond which it is sandy with rocky hills rising at a short distance inland. At the head of the bay, which is low, are several creeks and mangrove swamps extending some miles inland. The western shore is a succession of bluff points, separated by sandy beaches, behind which the land rises to table-topped hills.

The hills near the eastern shore of the bay are of even outline; but behind them are others of fantastic shape, the highest, in the form of a remarkable pillar, being very prominent.

The village of Jīwani (Jiunri), consists of two groups of mat huts, situated on low rocky cliffs on the eastern shore of Gwātar bay, about 2¼ miles northward of Ras Jīwani and a third group on that point. Partridge, hare, and gazelle shooting can be had.

There is good landing, even during the South-west monsoon, in a bay about 1½ miles northward of the western extremity of Ras Jīwani. At the head of this bay, and half a mile inland, is a white rectangular stone fort. The coastline of this part, as charted, was reported, in 1921, to be only approximately correct.

Khōr Jīwani is the easternmost creek at the head of the bay.

Ras Fāsteh (Fastā) (*Lat. 25° 04′ N., Long. 61° 25′ E.*), the eastern extremity of a detached ridge extending about 6 miles westward along the coast, is a cliff about 45 feet ($13^{m}7$) high.

South islet and North islet, lying about one mile eastward of Ras Fāsteh, are two small rocks situated close together on a reef, off which foul ground extends for about 4 cables; South islet, the higher, has an elevation of 108 feet ($32^{m}9$).

Two shoals, with depths of 4¼ and 4½ fathoms ($7^{m}8$ and $8^{m}2$), lie about 1½ and 2¾ miles, respectively, south-westward of Ras Fāsteh.

On the northern side of Ras Fāsteh is a small bay affording shelter to small craft, in depths of from 1½ to 3 fathoms ($2^{m}7$ to $5^{m}5$), mud.

Castle hill, about 3½ miles north-westwatd of Ras Fāsteh, is square, rocky, and 430 feet ($131^{m}1$) high; its summit, seen over the lower hills in front of it, resembles a fort. (*See* view on chart 38.) It does not, however, show until bearing less than about 340°.

The river Bahu or Dashtīārī Chīl, which flows into the bay, about 7½ miles north-eastward of Ras Fāsteh, is the mouth of two combined streams; it has a shallow bar, but is deep inside, and is tidal for some distance. The position of the entrance can be identified from a distance by the masts of the dhows anchored within. The only landing for boats is within the entrance.

The village of Gwātar stands near the mouth of the river Bahu.

There is a prominent white fort with two towers on the western side of the village. Between it and the river is a small round tower with a tall flagstaff.

After rain, the water is fresh some miles up the river. There are several creeks between the mouth of the river Bahu and Khōr Dasht, about 7 miles eastward.

Kūh Drabhol (Darabúl), northward of the middle of the bay and about 9 miles inland, is a detached table-topped hill, about 500 feet ($152^{m}4$) high, with sloping sides.

The depths in the bay, over a mud bottom, decrease regularly from

Chart 38, with plan of Gwatar bay.

about 6 fathoms ($11^{m}0$) at the entrance, but, in 1915, they were reported to be less than charted.

Khōr Dasht is the mouth of the river Dasht, the largest on this coast; the river flows south-westward and finally, passes eastward of Kūh Drabhol into the head of the khōr. The following is from a report in 1916. " The mouth of the khōr is about 2 cables wide, between flat sandy banks almost awash, and is encumbered by a bar in which the sea breaks during the South-west monsoon. The bar and breakers extend about one mile southward from the coast. The passage over the bar is on the eastern side of the breakers. A depth of 4 feet ($1^{m}2$) can be carried by keeping a grass-covered sand hill, situated near the shore on the western side of the entrance, in line with the third distant peak westward of Kūh Drabhol range, bearing 338°. Course should not be altered up the river until the sandy spit on the eastern bank is well clear of the eastern extremity of Kūh Drabhol. For the first two miles the eastern bank should be followed. Above this the greater depths are on the concave sides of the bends in the river. About 10 or 11 miles from the entrance, the depth is only 2 feet ($0^{m}6$), the tidal rise being from 2 to 3 feet ($0^{m}6$ to $0^{m}9$). The river is tidal for about 12 miles from its mouth; in places it decreases in width to about half a cable and there, when the river is in flood, the depths are from 2 to 3½ fathoms ($3^{m}7$ to $6^{m}4$)."

Chart 38.

PERSIAN MAKRĀN.—General remarks.—The coast of Persian Makrān extends from the Perso-Kalāt frontier in Gwātar bay (*Lat. 25° 10′ N., Long. 61° 33′ E.*), westward for about 210 miles to Jāsk. In places it is low, with ranges of mountains some distance inland, but there are many high rocky points and hills near the coast. The country, though barren, is not absolutely desert. There are a number of villages or settlements, but no town of importance, and the population is scanty.

For caution referring to volcanic disturbances, *see* page 59.

Navigation along this coast is impeded by the land being frequently obscured by dust haze, sounding being then the only guide; this is especially the case from April to July. Due to this haze, when only about 5 miles offshore and in depths of less than 10 fathoms ($18^{m}3$), it is often necessary to obtain the position of the vessel by astronomical observations.

Coast.—For about 6 miles west-north-westward of Ras Fāsteh (Fastā), the coast is cliffy, thence for 2 miles there is a low gap, where the coast recedes for a short distance, and for the next 7 miles to Ras Brīs, there are vertical white cliffs with a level summit about 200 feet ($61^{m}0$) high. From about 3 miles westward of Ras Fāsteh, the coast is fringed with a shoal bank gradually increasing in width until at Ras Brīs its outer edge lies about one mile offshore.

Ras Brīs is at the western end of the white cliffs; north-eastward of and detached from the latter, is a range of white clay hills with very remarkable peaks; both Ras Brīs and the range within it are prominent features (*see* view on chart 38). Brīs, about 1½ miles north-eastward of Ras Brīs, is a small fishing village on the shore of a bay on the northern side of the cape.

Anchorage may be obtained, in a depth of about 5 fathoms ($9^{m}1$),

Charts 2858, 748b.

Chart 38.

sand, in the middle of this bay; the depths shoal gradually towards the shore.

Between Brīs and Sīāh (Siya) kūh, about 18 miles west-north-westward, the coast is low and sandy. Sīāh kūh, about 1,000 feet ($304^{m}8$) high, is a dark round hill, situated close to the coast, with cliffs on its seaward side.

From Ras Brīs to about 3 miles eastward of Sīāh kūh there are depths of 5 fathoms ($9^{m}1$) about 1¼ miles offshore, but depths of 6 fathoms ($11^{m}0$) were obtained in 1911, about half a mile westward of Ras Brīs.

Kochu is a small settlement about 12 miles westward of Brīs and there is a large village on the coast, about 1½ miles east-south-eastward of Sīāh kūh.

Kinj Dap is a gap in the coastal hills on the western side of Sīāh kūh, through which flows a small stream named Kinj, the mouth of which is probably barred by sand, but after heavy rains in the interior it becomes open; at its mouth is a grove of acacia trees and on its eastern bank, about 2½ miles from the sea, is the village of Kinj.

Between Kinj Dap and Ras Chāhbahār (Chāhbār) (*Lat. 25° 16′ N., Long. 60° 36′ E.*), about 13 miles west-north-westward, the coast consists of rocky hills and cliffs, gradually decreasing in elevation towards the point. Inland of these coastal hills, a plain extends westward for many miles.

Khākī kūh (*see* view on chart 38), north-eastward of Sīāh kūh and about 9 miles inland, rises to an elevation of about 2,000 feet ($609^{m}6$). The range extends for some miles eastward and westward, and its southern face is vertical; its crest is deeply indented, and when seen from westward presents a double peak with a bluff south-eastward of it; being composed of white clay it shows up well when the sun shines on it.

Between Ras Brīs and Ras Chahbahār, the bottom, in depths of less than 10 fathoms ($18^{m}3$), is mud.

Chart 38, plan of Chahbár bay, 2851.

Bandar Chāhbahār.—Light.—Dangers.—Bandar Chāhbahār (Chāhbār) is entered between Ras Chāhbahār and Ras Kūhlāb, about 7½ miles westward.

Ras Chāhbahār is low and rocky and on it are some small sand hills; near its extremity is a small square tomb with a white dome, about one mile east-north-eastward of which are two dark coloured flat-topped buildings, one of which is the telegraph office, which assist in identifying the point; the latter building is visible from south-eastward. A reef extends about 3 cables westward from the point, and for about one cable farther westward the bottom is foul.

The north-western side of the point is bordered by a reef, and foul ground extends about 2½ cables offshore, as far north-eastward as a small clump of date trees near the ruins of a fort; northward of these trees the beach is sandy.

An obstruction was reported, in 1937, to lie three-quarters of a mile west-north-westward of Ras Chāhbahār. A shoal, with a depth of 2¾ fathoms ($5^{m}0$), lies about 9 cables northward of the point and the same distance offshore.

Ras Tīz lies about 3½ miles northward of Ras Chāhbahār and the intervening coast forms a small bay, at the head of which is the town of Chāhbahār.

Charts 2858, 748b.

Chart 38, plan of Chahbár bay, 2851.

A rocky bank, over which the depths are from 1½ to 2 fathoms ($2^{m}7$ to $3^{m}7$), extends 3 miles north-westward from Ras Tiz.

A light is exhibited, at an elevation of 36 feet ($11^{m}0$), from the roof of the telegraph office.

Ras Kūhlāb is the extremity of a promontory, the sides of which consist of low cliffs. Within Bandar Chāhbahār, and on the northern side of this promontory, is a cliffy point, 270 feet ($82^{m}3$) high, situated about 2½ miles north-westward of Ras Kūhlāb.

For the first 4 miles within the entrance points, the shores of the bay, on either side, are rocky; at the head of the bay is a large plain, the shores of which are low and swampy.

For about 2¾ miles south-eastward of Ras Tiz, the shore of Bandar Chāhbahār consists of cliffs about 150 feet ($45^{m}7$) high, rising steeply to a tableland about 400 feet ($121^{m}9$) high, the southern side of which is composed of cliffy terraces, and the south-eastern side, about 4 miles eastward of Ras Tiz, is in places almost precipitous (*see* view facing page 87). North-eastward of Ras Tiz, the cliffs turn inland forming the southern side of the large plain inland of Bandar Chāhbahār. Immediately northward of Ras Tiz is the mouth of a valley, in which, about one mile inland, is the village of Tiz. At the entrance of this valley is a small hill on which is a fort, and, fronting it, a shallow lagoon which fishing craft can enter at high water.

Namak rūd flows out about 6 miles northward of Ras Tīz.

The village of Kunārak (*Lat. 25° 21′ N., Long. 60° 24′ E.*) is situated on the western shore of Bandar Chāhbahār about 5¾ miles north-westward of Ras Kūhlāb; there was a conspicuous tree, in 1911, close southward of the village.

A range of mountains, on the northern side of the plain at the head of Bandar Chāhbahār, runs parallel with the coast about 8 miles inland; one of its summits, Kūh-e Sadgird (Guransan), is remarkable and about 2,400 feet ($731^{m}5$) high; about 10 miles westward of it, is a sharp spiked peak which may be identified from south-westward.

Anchorage.—Directions.—Anchorage may be obtained by small vessels in Bandar Chāhbahār, in a depth of about 4 fathoms ($7^{m}3$), sand, with the tomb on Ras Chāhbahār bearing 170°, and the mosque (*see* below) in Chāhbahār bearing 110°; native craft anchor, in depths of about 2 fathoms ($3^{m}7$), about half a mile off the town.

During the South-west monsoon, when a heavy south-south-easterly swell is rolling into the bay, sheltered anchorage with no swell may be obtained about 3½ miles eastward of Kunārak; this anchorage also affords shelter during a shamāl.

Anchorage in Bandar Chāhbahār is prohibited southward of a line drawn 270° from the mosque in the town.

The best landing place is directly under the barracks in Chāhbahār, where a good lee is given by a flat rock. During the South-west monsoon, landing is difficult owing to the heavy swell.

The two entrance points of the bay, being light in colour, are not easily distinguished at night, and should be approached with caution, vessels being guided by the light on the telegraph office.

The tidal streams in the bay are scarcely perceptible.

Chāhbahār.—This town is situated on the eastern side of Bandar Chāhbahār about 1¼ miles north-eastward of Ras Chāhbahār. A large white mosque, with a white dome, stands about half a mile

Charts 2858, 748b.

Chart 38, plan of Chahbar bay, 2851.

northward of the light structure and is conspicuous from seaward.

Barracks, consisting of three large one-storied buildings, are situated near the telegraph ststion.

Port facilities.—Sheep and bullocks may be procured from the neighbouring country. Ibex may be shot on Ras Kūhlāb.

A Persian doctor is Quarantine officer at Chāhbahār.

Chāhbahār is connected to the general telegraph system.

For communication by air, *see* page 18.

Climate.—Health.—During the South-west monsoon in the Indian ocean, south-south-easterly winds of some strength are common by day, but fall light at night. These winds cause a heavy sea to break all round the shores of the bay, except at the town, which is sheltered. The shamāl is fairly frequent in winter. The prevalence of south-south easterly winds renders Chāhbahār much more suitable to Europeans than almost any other place in, or near, the entrance of the Persian gulf.

Chart 2851.

Coast.—Anchorages.—Dangers.—A short distance westward of Ras Kūhlāb the coast becomes higher and may be safely approached to a distance of about one mile. Ras Pūzīm, about 9 miles west-north-westward of Ras Kūhlāb, is faced with cliffs, about 300 feet ($91^{m}4$) high; there are depths of 18 feet ($5^{m}5$) within about one mile of the point, outside which the depths increase to 6 and 8 fathoms ($11^{m}0$ and $14^{m}6$). Bander Pūzīm is entered between Ras Pūzīm and Ras Rashīdī, about 6 miles westward.

Ras Rashīdī (*Lat. 25° 20′ N., Long. 60° 12′ E.*) is the eastern extremity of a table-topped promontory, about 150 feet ($45^{m}7$) high, the southern side of which trends west-north-westward for about 7 miles, and ends in a somewhat higher vertical cliff; this promontory is almost inaccessible on all sides, and the land on its northern side is low and sandy; depths of less than 6 fathoms ($11^{m}0$) extend as much as 2½ miles off its southern side.

The shore of Bander Pūzīm within the entrance points is low and sandy.

Pūzīm is a small fishing village, on the eastern side of the bay, close northward of Ras Pūzīm. There are a few huts, on the western side of the bay northward of Ras Rashīdī.

Anchorage may be obtained off Pūzīm, in a depth of about 24 feet ($7^{m}3$), or on the western side of the bay.

Sirgān rūd flows into a large creek on the north-eastern side of Bandar Pūzīm. Kair rūd flows into a salt-water creek about 1½ miles northward of Ras Rashīdī.

The great plain inland of Bandar Chāhbahār continues westward past Bandar Pūzīm, the mountains being about 12 miles inland; but in front of the latter are some lower hills, one of which, Sapt kūh, rises about 6 miles from the head of the latter bay to an elevation of 310 feet ($94^{m}5$), and is conical.

Baklang, a rock which dries and is steep-to, lies 2½ miles south-eastward of Ras Rashīdī; when covered there is nothing to indicate it in calm weather. At night, a vessel should not approach within depths of less than 20 fathoms ($36^{m}6$).

Ras Tānk, a rocky promontory, on which are some sand hills about 30 feet ($9^{m}1$) high, lies about 10½ miles westward of the western extrem-

Charts 2858, 748b.

Chart 2851.

ity of the promontory of which Ras Rashīdī is the eastern extremity; it extends about one mile from the coast, to which it is joined by a narrow sandy isthmus. There is a bay between these two points, the shore of which is bordered by low sand hills. A small group of brown hills, westward of which are some date palms and a few large trees, is situated about 4 miles north-eastward of Ras Tānk, and is a good mark.

There are depths of 7 fathoms ($12^{m}8$) about half a mile southward of Ras Tānk; but a bank, over which there is a depth of 24 feet ($7^{m}3$), extends about one mile eastward from the promontory; the small bay on the western side of the promontory is shallow, and a shoal bank extends about 2 miles westward from the western end of the latter.

As soundings give little warning, Ras Tānk should not be approached at night into a depth of less than 30 fathoms ($54^{m}9$).

Anchorage was obtained by H.M.S. *Bramble*, in March, 1919, in a depth of 20 feet ($6^{m}1$), with the eastern end of Ras Tānk bearing 197°, distant about 5 cables, but the bottom was rocky and the holding ground bad.

The village of Tānk (*Lat. 25° 22′ N., Long. 59° 53′ E.*) is situated about one mile northward of Ras Tānk.

For about 3 miles north-westward of Ras Tānk the coast is cliffy, thence for about 14 miles to Ras Makī it is low, but the point itself is about 100 feet ($30^{m}5$) high.

The village of Hūmdān is situated in a grove, on the banks of a creek about 3½ miles eastward of Ras Makī.

Discoloured water was observed in 1919 off the coast between Ras Tānk and Ras Jagīn (page 80), nearly 100 miles westward; it is apparently caused by the water brought down by the rivers, which is carried along the coast by the tidal streams; the edge of the discoloration is no guide to the depth, as its distance from the coast is continually varying.

Kūh Kalāt is a range of white clay cliffs of remarkable outline; its south-eastern extremity is situated about 10 miles north-westward of Ras Tānk, whence it extends about 22 miles west-north-westward. A vertical cliff, about 650 feet ($198^{m}1$) high, rises about 4 miles from its eastern end and shows up well from south-eastward.

Bīri Sai Padag, a sharp double peak, 1,650 feet ($502^{m}9$) high, is situated on the northern side of Kūh Kalat, about 8½ miles north-eastward of Ras Makī. A remarkable single peak rises about 3½ miles west-south-westward of Bīri Sai Padag to an elevation of 1,285 feet ($391^{m}7$). From a distance of about 33 miles south-westward, these summits appear as a group of three conical peaks and form a good landmark.

The mountain range inland of the great plain at the head of Bandar Chāhbahār becomes lower as it extends westward, and northward of Ras Tānk becomes less prominent.

Between Ras Makī and Ras Maidānel (Maidānī), 27 miles westward, the coast is low and sandy, and intersected by creeks; there are depths of less than 3 fathoms ($5^{m}5$) within 1½ miles of the coast.

Khōr Darak is entered about 6 miles north-westward of Ras Makī; anchorage may be obtained about half a mile off its entrance, in a depth of 15 feet ($4^{m}6$). About 7 miles farther westward is the entrance

Charts 38, 2858, 748b.

Chart 2851.

to Khōr Gālag, the mouth of Rūd Rābch, which flows from the interior for a distance of about 100 miles.

The coast in the vicinity is bare and the entrance points of the creek are only about one foot ($0^{m}3$) high; but there are some tall palms, close eastward of its mouth, which are a good guide. About one mile upstream, and on the eastern side of the creek, there is a small village (*Lat. 25° 29′ N., Long. 59° 22′ E.*); it is situated near some palm trees, but the tops only of the latter were visible from westward, their trunks being obscured by sand hills, though from southward they are visible from seaward.

The bar, on which there is always a surf, extends about 1¼ miles off the entrance of the creek, and the channel across it, in which there was, in 1913, a depth of about 1¼ fathoms ($2^{m}3$), trends in a north-westerly direction. The river nearly dries, but off the western entrance point there is a depth of about 3 feet ($0^{m}9$). Dhows occasionally enter the creek at half tide.

Anchorage may be obtained, in a depth of 5 fathoms ($9^{m}1$), with the entrance of the creek bearing 170°, distant about 2½ miles, but within that distance the depths appear to shoal rapidly to 2 fathoms ($3^{m}7$).

In 1911, the best approach to the river was from eastward until its mouth was well open; thence the vessel should steer directly towards the western entrance point, keeping close to the breakers on the western side; but the condition of the entrance may be subject to change.

The best landing, with westerly winds, is on the western entrance point of the creek.

Chart 145, plan of Hor Rabij.

Khōr Rābch.—Anchorage.—Directions.—Khōr Rābch (Rabij), entered about 7 miles westward of Khōr Gālag, is the mouth of a large tidal backwater encumbered with flats of mud and sand. About 1¼ miles outside the entrance, there is a bar, over which the depths in 1911 were from 1½ to 6 feet ($0^{m}4$ to $1^{m}8$) and on which the sea breaks at low water. There are depths of from 1½ to 6½ fathoms ($2^{m}7$ to $11^{m}9$) in the channel within the bar.

On the entrance points are some low sand hills, and the country in the vicinity is desert; the inlet appears to be of no importance and is frequented only by fishing boats. Inland of Khōr Rābch there are several villages and groves of date palms.

Anchorage may be obtained, in depths of from 4½ to 4¾ fathoms ($8^{m}2$ to $8^{m}7$), sand, about 2½ miles southward of the entrance of the khōr.

The following directions were used in 1911, but may not now hold good. To enter the khōr, the bar should be approached, as close as possible, with the eastern edge of Korat al Úsif, 80 feet ($24^{m}4$) high, seen over the eastern entrance point, bearing 349°; thence course 334° will lead across the bar, a good lookout being kept for breakers on the eastern side. When inside the bar, course should be altered to pass about one cable westward of a fuzzy bush, on the eastern entrance point, after passing which the channel follows the western shore of the inlet until abreast a low sandy spit extending westward from the eastern shore. Landing can be effected, near the fuzzy bush, on the low sandy spit.

Charts 38, 2858, 748b.

Chart 2851.

Coast.—Shoal.—Ras Maidānel (Maidānī) is faced with white cliffs, 155 feet ($47^{m}2$) high, which extend about 3 miles westward, whence, for a farther 2 miles, the coast is low and sandy and covered with small bushes. The hills, which terminate in the cliffs, are about 200 feet ($61^{m}0$) high, table-topped, and brown in colour. (*See* view on chart 38.) Westward of the cliffs, and at a short distance inland, is a large date grove.

From northward of the hills near Ras Maidānel (*Lat.* 25° 24′ *N.*, *Long.* 59° 06′ *E.*), the great coastal plain continues about 60 miles westward.

The coastal bank, with depths of less than 18 feet, extends about 1½ miles southward from Ras Maidānel, and fringes the coast for about 10 miles north-westward; it attains its greatest width about 5 miles westward of the point where its outer edge lies about 3 miles offshore. Caution is necessary when approaching Ras Maidānel, especially at night, for the soundings give very little warning.

A small bay, protected by a rocky point on which stands a tower, affords a good landing about 17 miles north-westward of Ras Maidānel. From a position about one mile eastward of the rocky point, to Ras Sādaich, about 9 miles westward, and beyond, the coastal bank extends about 2 miles offshore.

Sādaich rūd flows through swampy ground into a tidal creek at Ras Sādaich, and is fronted by a shallow bar; the course of the river beyond the mountains has not been examined. Boats cannot enter the river at low water, and within it is shallow; it is probable that the entrance is subject to change. On the banks of the river, at some distance inland, are a village and some date groves. Darhaman kūh, on the western side of which there lies an extensive valley, rises to an elevation of 2,120 feet ($646^{m}2$), about 19 miles north-eastward of Ras Sādaich.

Aspect.—Bashāgerd, an inland district of Persian Makrān, northward of Jāsk and westward of Sādaich Rūd, is very mountainous and very little is known of it.

Gohart kūh, from 3 to 5 miles inland, about 7 miles eastward of Sādaich rūd, has three principal conical peaks, the northern and highest being 490 feet ($149^{m}3$) high. There is a flat-topped hill on the plain about 9 miles eastward of Gohart kūh.

Gūh kūh, about 36 miles north-north-westward of Ras Sādaich, rises to an elevation of 6,220 feet ($1895^{m}9$); it appears to be almost detached from the neighbouring mountains in Bashāgerd, and from south-eastward its eastern side shows a great bluff, though from westward its summit appears rounded. *See* view on chart.

The coastal range extends westward from the vicinity of Darhaman kūh towards Jāsk, about 50 miles westward of Ras Sādaich, the elevation of its peaks varying from 1,320 to 2,540 feet ($402^{m}3$ to $774^{m}2$).

A range of bare white sand hills, about 100 feet ($30^{m}5$) high, extends about 6 miles westward along the coast from Ras Sādaich; there is a conspicuous tree at the western end of these sand hills.

Coast.—Anchorage.—Ras Jagīn lies about 33 miles westward of Ras Sādaich; the coast between the sand hills and the point is very low, and is intersected by mangrove swamps and the mouths of numerous creeks; the creek immediately westward of the sand hills affords shelter to boats, having, in 1910, depths of 2 feet ($0^{m}6$) on the bar and of

Charts 38, 2858, 748b.

Chart 2851.

from 6 to 8 feet ($1^{m}8$ to $2^{m}4$) a short distance within, between steep-to banks about 6 feet ($1^{m}8$) high. Local craft enter other creeks, which are the mouths of streams descending, through gaps in the coastal mountains, from the Bashāgerd mountains. One of the largest of these streams is Gabrīg rūd, which flows out about 20 miles westward of Ras Sādaich (*Lat.* 25° 34′ *N., Long.* 58° 41′ *E.*).

The bank eastward of Ras Sādaich continues to fringe the coast between the mouth of Sādaich rūd and that of Gabrīg rūd and extends about 2 miles offshore. An isolated sand hill, covered with scrub, rises about 1¼ miles westward of the mouth of Gabrīg rūd. The boat channel into Gabrīg rūd lies at the eastern end of the bar at its mouth and has a depth of about one foot ($0^{m}3$).

Anchorage may be obtained off the mouth of Gabrīg rūd, in a depth of 5 fathoms ($9^{m}1$), about 2 miles offshore, but the depths decrease rapidly to 2 fathoms ($3^{m}7$) towards the coast.

A north-easterly current was experienced in 1911, between the mouth of Gabrīg rūd and Ras Jagīn.

Ras Jagīn is very low and sandy, and Jagīn rūd flows out close eastward of it; inland of the point is a mangrove swamp, whence a plain extends to the foot of the hills. A sandy spit, which dries, extends about half a mile south-westward from the point, there being depths of 18 feet ($5^{m}5$) about one mile offshore; it is probable that the configuration of this point alters after heavy rains or storms; as there are depths of from 18 to 20 fathoms ($32^{m}9$ to $36^{m}6$) within one mile of the spit, soundings afford little guide and caution is necessary when in its vicinity, particularly as the point itself is difficult to identify and the appearance of the hills inland cause the distance offshore to be easily over-estimated.

Jāsk East bay.—Jāsk East bay is entered between Ras Jagīn and Ras Jāsk, about 18 miles west-north-westward. The north-eastern shore of the bay is low and is fringed by a sand bank, which dries out about half a mile. There is an entrance to a stream about 8 miles north-westward of Ras Jagīn. At the head of the bay, the hills approach within one mile of the shore, the coastal range ending in Hushdan kūh, a ridge of white cliffs, 1,720 feet ($524^{m}3$) high, which, from westward, appears wedge-shaped. The village of Chahru, with a few date palms, lies between Hushdan kūh and the shore. The north-western shore of the bay is rocky and level, about 14 feet ($4^{m}3$) high, with a sandy beach and, in places, rocky ledges and low cliffs.

Anchorage.—**Caution.**—Anchorage, somewhat sheltered from westerly winds, may be obtained, in depths of from 6 to 8 fathoms ($11^{m}0$ to $14^{m}6$), close off the north-western shore of the bay. The bay is open south-eastward and there is usually a light surf on the beach which becomes heavy during the South-west monsoon, although there may be only a slight ground swell in the bay. The bay is open to north-easterly and easterly winds in winter. During a strong shamāl, the wind is westerly and it is reported that the anchorage is then good, though a considerable swell rolls round the cape, causing a vessel at anchor to ride uneasily. For warning of a strong shamāl, *see* page 22.

Charts 145, 2851.

A vessel should not anchor with the beacon on Ras Jāsk (*see* below),

Charts 145, 2851.

bearing less than 046° or more than 270°, on account of the existence of telegraph cables.

The best landing place is on a sandy beach between the beacon and the cliffs north-eastward of it.

Chart 145.

JASK BAY.—Light.—Beacon.—This bay is entered westward of Ras Jāsk; its shore is composed of sand hills, from 10 to 20 feet ($3^{m}0$ to $6^{m}1$) high.

Ras Jāsk is low and is the extemity of a point which extends a considerable distance from the general line of the coast. At its extremity there is a small tomb, 15 feet ($4^{m}6$) high, close to which are two dark flat-topped buildings.

A light is exhibited, at an elevation of 37 feet ($11^{m}3$), from a white, circular, tower on the northern corner of a small square stone house, 23 feet ($7^{m}0$) in height, situated about 2 cables northward of Ras Jāsk (*Lat. 25° 38′ N., Long. 57° 45′ E.*).

A stone beacon, painted black and white in horizontal bands and 30 feet ($9^{m}1$) in height, stands on the shore of Jāsk East bay, about 4½ cables east-north-eastward of Ras Jāsk.

The telegraph buildings, about 4 cables north-eastward of the cape, consist of three flat-roofed blocks, the northern and southern blocks having prominent square towers; near them are some water tanks.

The village of Jāsk, which in 1942 had a population of about 1,200, and in which there is a stone fort, extends about one mile north-eastward, along the shore of the bay, from a position about half a mile north-north-eastward of the cape.

A water tank, on pillars, and roofed in, about one mile north-eastward of the telegraph buildings, is a good mark.

Jāsk creek, about 3½ miles north-north-eastward of Ras Jāsk, is entered by a channel through the sands, with a depth of about 1½ feet ($0^{m}4$), with greater depths inside; the creek winds through mangrove swamps for about 4 miles and is used by native craft; the sands, which dry, extend nearly one mile off the mouth of the creek.

The fort of Jāsk is situated about 2½ miles northward of the mouth of the creek and about one mile inland; it is in a ruinous condition with a few houses and date trees near it, and a range of white sand hills south-eastward of it; it is not easily identified from seaward.

Dangers.—Buoy.—Mason shoal, about 3 miles west-south-westward of Ras Jāsk, has a least depth of 16 feet ($4^{m}9$), coarse sand and shells.

A flat, over which there are depths of from 2½ to 3 fathoms ($4^{m}6$ to $5^{m}5$), extends about 2 miles north-westward from Ras Jāsk.

A red conical buoy surmounted by a globe lies near the north-western extremity of the flat.

The western extremity of Kūh Gaigan (page 97), bearing 354°, led, in 1936, between Mason shoal and the flat.

Anchorage.—Directions.—Convenient anchorage, partially sheltered from southerly winds by the flat extending from Ras Jāsk and by Mason shoal, but open to the shamāl, may be obtained by vessels with a draught up to 16 feet ($4^{m}9$), in a depth of 3½ fathoms ($6^{m}4$), with the lighthouse on Ras Jāsk bearing 173°, distant about 12 cables.

Charts 753, 38, 2858, 748b.

Chart 145.

Larger vessels anchor farther out, in a depth of 4½ fathoms (8^{m}2), with the lighthouse bearing 153°, distant about 2 miles.

Approaching from southward or eastward, a vessel may pass between Mason shoal and the flat extending from Ras Jāsk (*Lat. 25° 38′ N., Long. 57° 45′ E.*); after rounding the buoy at the north-western end of the flat, course may be shaped as requisite for the anchorage; the least depth on this route is 3¾ fathoms (6^{m}9).

Good landing may be obtained at high water within a rocky point about a quarter of a mile northward of the telegraph buildings.

Warning of the approach of a strong shamāl may often be obtained at the telegraph office where information is received of the beginning of one at Bushire.

Climatic table.—*See* page 31.

Port facilities.—Communications.—Fresh meat and bread can be obtained, but no vegatables; fish is plentiful.

Jāsk is connected to the general telegraph system.

For communication by air, *see* page 18.

Radio station.—There is a radio station at Jāsk, *see* page 18.

Chart 2851.

Tidal streams.—Between Ras Jāsk and Ras al Kūh, about 26 miles west-north-westward, the tidal streams off the coasts set eastward on the falling tide and westward on the rising tide; near Ras Jāsk, the streams are weak, but the rate increases towards Ras al Kūh. In December, 1922, H.M.S. *Espiegle* experienced a strong set in the channel between Ras Jāsk and Mason shoal, though outside the channel the stream did not appear to be strong.

Charts 753, 38, 2858, 748b.

CHAPTER IV

ENTRANCE TO THE PERSIAN GULF.—RUŪS AL JIBĀL, FROM DIBBA TO RAS ASH SHAʻM, AND THE COAST OF PERSIA, FROM JĀSK TO CHĀRAK, INCLUDING BANDAR ʻABBĀS AND QISHM ISLAND.

Chart 753.

RUŪS AL JIBĀL.—Aspect.—This great and mountainous promontory, the northern end of which is the Masandam (Musandam) peninsula, is situated on the western side of the entrance of the Persian gulf. Its coasts are everywhere precipitous, the cliffs in most places overhanging, their bases having been eroded by the sea. There are many small sandy bays at the mouths of the valleys, and the mountains rise abruptly from the coast. The promontory is indented, on its eastern and northern sides, by numerous inlets, in which there are considerable depths. Except in a few small valleys where date groves, etc., are to be found, the land is barren, though in some of the fissures of the hills there is a scanty vegetation. The mountains, apparently consisting of bare rock, present a wild appearance, and are infested by wolves, leopards, hyænas and foxes.

The inhabitants of the promontory are herdsmen and fisherfolk; they are very superstitious.

From eastward the mountain ranges of Ruūs al Jibāl appear to have two principal peaks. Jabal Qaʻwa (*Lat. 25° 45′ N., Long. 56° 13′ E.*), the southern peak, has a small notch in its summit, and rises to an elevation of 5,885 feet ($1793^{m}7$), about 6 miles north-north-westward of Al Karsha (page 58).

Jabal al Harīm, the northern peak, lies about 14 miles northward of Jabal Qaʻwa; it is about 8,100 feet ($2468^{m}9$) high, and has a truncated or small table top with a small notch in its southern part. *See* view D on chart 2851.

Coast.—Ras Haffa, about 3¾ miles north-north-eastward of Ras Suwat (page 58), is the southern extremity of a narrow promontory on the eastern side of Dōha Haffa; the promontory is of moderate height and decreases in elevation towards the point.

Dōha Haffa, entered westward of Ras Haffa, is a narrow inlet with depths of from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$), and 4 fathoms ($7^{m}3$) close inshore. The cove, which lies between high land sloping down to the water's edge, is landlocked and not noticeable from seaward. A short distance within its entrance on its western side, there is a small bay with a sandy beach at its head where there is a date garden and a few huts. At the head of the cove, there are two small villages, one on either side. H.M.S. *Triad* reported, in 1930, that the cove appeared to be shorter than charted, and that there were few places within it where landing is possible. This was confirmed by H.M.S.

Charts 2851, 2837, 2858, 748b.

Fowey, in 1934, when she anchored near the head of the cove.

Khōr Mala is entered about 3½ miles north-north-eastward of Ras Haffa, the coast between being bordered by cliffs, from 2 to 3 cables off which there are depths of 20 fathoms ($36^{m}6$). The shores of this cove are indented, and the depths decrease from 8 fathoms ($14^{m}6$) in the entrance towards the head. About 3¼ miles farther northward there is another cove, in the entrance to which there is a depth of 8 fathoms ($14^{m}6$), decreasing to 3 fathoms ($5^{m}5$) in its inner part, where it is about half a mile wide; about half-way in, the cove narrows to a width of about 2 cables.

Dōhat Shārja, the southern entrance point of which is about 7½ miles north-north-eastward of Ras Haffa, is separated from the last-mentioned cove by a promontory about three-quarters of a mile wide; it is open eastward and there are depths of 20 fathoms ($36^{m}6$) in the entrance, decreasing gradually to the sandy beach at the head of the cove.

Between the northern entrance point of Dōhat Shārja and Ras Hamra, about 3 miles north-north-eastward, the coast is precipitous. Jabal Līma, about 1¼ miles south-westward of Ras Hamra, appears as a fine cone from northward; about 3 miles west-south-westward of it is a somewhat higher saddle-shaped mountain that is also prominent from northward (*see* view D on chart 2851); from eastward these mountains do not show up against the higher land farther inland.

Ghubbat ‘Aqaba is entered between Ras Hamra (*Lat. 25° 54′ N., Long. 56° 26′ E.*) and Ras Samūt, about 2½ miles north-eastward. In the north-western corner of this bay is ‘Aqaba, a small village, close off which boats may obtain shelter from the nạshi, the worst wind on this coast.

Ras Līma, about 1½ miles north-eastward of Ras Samūt, is the termination of a narrow, precipitous promontory.

Jazīrat Līma, about 3½ cables eastward of Ras Līma, is a precipitous islet, 285 feet ($86^{m}9$) high. There is a depth of 20 fathoms ($36^{m}6$) in the channel between the islet and the point, and a small detached rock lies close to the former. The tidal streams through the channel are strong. Close eastward of the islet there is a depth of 30 fathoms ($54^{m}9$).

Līma.—Anchorage.—About 1½ miles westward of Ras Līma is a sandy bay, on the southern shore of which, at the mouth of a valley, stands the village of Līma, part of which extends up the side of the hill on terraces; in the valley there is a date grove and some cultivation. A spit extends about 2 cables offshore near the date grove north-westward of the village. The mountains in the vicinity of Līma rise abruptly to considerable elevations. At the northern end of the sandy bay is a high precipitous hill, close off which lie four rocky islets from 10 to 30 feet ($3^{m}0$ to $9^{m}1$) high.

When visited by H.M.S. *Cyclamen*, in 1922, and by H.M.S. *Fowey*, in 1934, the inhabitants were perfectly friendly.

Anchorage may be obtained off Līma, in a depth of about 12 fathoms ($21^{m}9$), but it is open eastward and north-eastward. A small bight on the southern side of the bay, close to the cliffs, which is used by native boats affords the best landing place in easterly winds.

Coast.—Ras Marovi is the northern entrance point of a bay situated

Chart 753.

3 miles north-north-westward of Ras Līma, in which there is a patch of sandy beach. Two rocky islets, about 25 feet (7^{m}6) high, lie about a quarter of a mile off Ras Marovi, and a rock, of the same elevation, lies about one mile north-north-eastward of the same point and nearly half a mile offshore, with a deep channel between the rock and the coast. About 2¼ miles northward of Ras Marovi is Ras as Samīd, a high cliffy point, with several small bays between them.

Dōha Qabal (Duhat Kabal) is entered between Ras as Samīd and a point about 1½ miles northward; the shores are indented by several bays with small beaches, separated by cliffy points. At the head of the inlet is a narrow cove with a sandy beach. About a mile south-westward of the head, the mountains rise vertically, and form a tremendous bluff, over 4,000 feet (1219^{m}2) high. In 1902, H.M.S. *Redbreast* anchored in a depth of 7 fathoms (12^{m}8) about 1½ cables from the head of the cove and found that within 5 fathoms (9^{m}1) the depths shoaled steeply to the beach.

The cove teems with fish. In the western branch of this valley or water-course are the ruins of an extensive village, and there are some huts at the head of the cove.

There is a small bare hill on the summit of the lofty cliffs at the northern entrance point of the inlet, and thence the deeply furrowed cliffs trend north-eastward in an unbroken line of irregular but decreasing elevation. Ras Sarkan (*Lat. 26° 05′ N., Long. 56° 29′ E.*), a vertical cliff of considerable height, is situated about 3 miles north-eastward of the small bare hill.

Ghubbat al Ghazīra.—Anchorage.—This extensive inlet is entered between Ras Sarkan and Ras Dilla, a vertical cliff, from 200 to 300 feet (61^{m}0 to 91^{m}4) high, with a conical summit, about 2¾ miles northward; its shores are deeply indented, high, and precipitous, except where valleys terminate in a few small sandy bays. In the inlet on the southern side of Ghubbat al Ghazīra, entered 4½ miles westward of Ras Sarkan, there is a village, and on the shore of the small bight entered about 8 miles west-north-westward of the same point, is the village of Habalain. Fish are plentiful and can be caught in the seine. In the entrance to Ghubbat al Ghazīra the bottom is rocky, but within it is mostly mud.

On the northern side of Ghubbat al Ghazīra are two large inlets separated by a high, narrow, and rugged peninsula. The village of Maqāga is situated on the shore of the western of these inlets, the northern side of which is the narrow ridge or isthmus connecting the middle of the north-eastern coast of Ruūs al Jibāl to Masandam peninsula; in places the isthmus is only about 3 cables wide and on its northern side is Khōr ash Shamm, entered from the Persian gulf, *see* page 93.

Film is a village at the head of the outer or eastern inlet on the northern side of Ghubbat al Ghazīra.

In 1949, H.M.S. *Loch Quoich* anchored about 3 cables off Film, in a depth of 22 fathoms (40^{m}2).

Good anchorage may be obtained over a sandy bottom in the bight, on the shore of which stands the village of Habalain. This bight is the northern of the two bays indicated on the chart. In 1948, H.M.S. *Wild Goose* anchored in the centre of the northern bay in a depth of 8 fathoms (14^{m}6), sand, with a mosque in the village bearing 191°.

Charts 2851, 2837, 2858, 748b.

Chart 753.

The mosque, which has four arches and is a prominent feature, is situated on the foreshore on the eastern side of the village. Depths in the approach to this bay shoal suddenly at its entrance to about 11 fathoms ($20^{m}1$), and thence decrease gradually to the sandy bay at its head. The local inhabitants are of a migratory type; fresh water is scarce and dependant on direct rainfall.

In 1936, H.M.S. *Deptford* anchored, in a depth of 25 fathoms ($45^{m}7$), in the western inlet on the northern side of Ghubbat al Ghazīra, with Karni Dābshun, situated about 6 miles north-north-westward of Ras Dilla, bearing 073°, and Maqāga village, 298°.

MASANDAM PENINSULA.—Eastern side.—Masandam (Musandam) peninsula consists of a series of small, lofty peninsulas and headlands, enclosing numerous inlets. Many of them are good harbours, though the depths in them are as a rule inconveniently great, but owing to the intense heat in summer, rendering the climate unsuitable for Europeans, they can hardly be used then even as temporary anchorages. Two of its peaks rise to an elevation of about 3,000 feet ($914^{m}4$), and many others to between 1,000 and 2,000 feet ($304^{m}8$ and $609^{m}6$). *See* view facing this page and view D on chart 2851.

The peninsula, of which Ras Dilla is the extremity, begins at the village of Film and has on its widest part a remarkable peak, brown in colour, over 1,000 feet ($304^{m}8$) high, with a small round knob on its summit; it separates Ghubbat al Ghazīra from Ghubbat ash Shābūs. The depths off Ras Dilla are irregular. On the north-western side of the point is a small bay, open north-eastward, with depths of about 15 fathoms ($27^{m}4$). Ghubbat ash Shābūs is entered between a point about 2¼ miles north-north-westward of Ras Dilla (*Lat. 26° 08′ N., Long. 56° 29′ E.*) and Ras Bāshin, about 1¾ miles farther northward. The shores of the bay consist of high cliffs, which are steep-to, with here and there small sandy beaches.

Shābūs is a village on the shore of a small bay on the south-western side of Ghubbat ash Shābūs. Two other villages stand on the shores of the northern part of the bay.

Chart 3452, plan of Khasab bay and Khor ash Shumm.

Karni Sibi is a remarkable cone with a flat scalloped top, rising to an elevation of 3,010 feet ($917^{m}4$), about 3½ miles north-westward of Ras Bāshin. *See* view D on chart 2851.

Chart 753.

Jabal Kaisa is a conical hill of light colour, rising to an elevation of over 1,000 feet ($304^{m}8$), about 2¼ miles northward of Ras Bāshin. Ras Bāshin is about 100 feet ($30^{m}5$) high, light red in colour, and steep-to; an islet lies about 8 cables north-eastward of it and about half a mile offshore.

Abu al Mawār, over which there is a depth of 6 feet ($1^{m}8$), is a reef reported by the Arabs prior to 1870, to lie close offshore near the islet off Ras Bāshin.

Off-lying islet.—Jazīrat Umm al Faiyārin, 353 feet ($107^{m}6$) high, and of light colour, lies about 3¼ miles eastward of Ras Bāshin; its western side is precipitous, but it is possible that landing could be effected on its south-eastern side; the islet is steep-to. *See* view D on chart 2851.

Charts 2851, 2837, 2858, 748b.

Chart 753.

Tidal streams.—Caution.—In the vicinity of Jazīrat Umm al Faiyārin the tidal stream entering the Persian gulf on the rising tide usually sets northward along the coast as far as Jazīrat Masandam whence it sets north-westward towards Salāma wa Banāt-hā (page 89) and westward towards Ras Sharaita (page 90); the tidal stream flowing out of the gulf on the falling tide usually sets in the opposite direction. The rate of the stream is from 2 to 3 knots, though off Ras Masandam it may attain a rate of about 4 knots, and perhaps even more at springs.

The tidal streams are very strong near Jazīrat Umm al Faiyārin. and from its vicinity to Jazīrat Masandam and Salāma wa Banāt-hā, with eddies and races, especially near the northern end of the island; sailing vessels should avoid approaching this side of the entrance of the Persian gulf, especially as the wind is uncertain near the high land, often failing or shifting suddenly to the opposite quarter.

Dōhat ash Shisha.—Dōhat ash Shīsha (Duhat Shisah) is entered between Ras Kaisa, about 3 miles northward of Ras Bāshin, and Ras Qabr al Hindi (Kabr Hindi), about 5 miles farther northward. Ras Kaisa is about 100 feet ($30^{m}5$) high and light red in colour; White rock, 37 feet ($11^{m}3$) high, lies about 1½ cables north-eastward of it, and is steep-to.

Ras Qabr al Hindi is 1,448 feet ($441^{m}3$) high and precipitous. (*See* view D on chart 2851). There are considerable depths half a mile from the cape.

The shores of Dōhat ash Shīsha are indented and precipitous though there are some small sandy beaches in the coves. There are considerable depths close to the cliffs, and the bottom is a fine grey sand. The south-western shore is separated from Khōr ash Shamm (page 93) by a ridge with a least width of three-quarters of a mile; the western shore is separated from Khor Ghubb ʻAli (page 92) by a similar ridge about one mile wide.

Red islet (*Lat.* 26° 17′ *N., Long.* 56° 27′ *E.*). so called from its colour, is the largest and southernmost of three islets, lying about half-way in on the northern side of the bay. It is in two parts, joined by a narrow and stony neck, the southern and highest part rising to an elevation of 183 feet ($55^{m}8$). The middle islet is the highest of the three and has sheer cliffs; its craggy peak, 368 feet ($112^{m}2$) high, overhangs eastward. The northern islet is a rocky stack, 62 feet ($18^{m}9$) high.

In 1935, H.M.S. *Shoreham* obtained a depth of 9½ fathoms ($17^{m}4$) midway between Red islet and the middle islet.

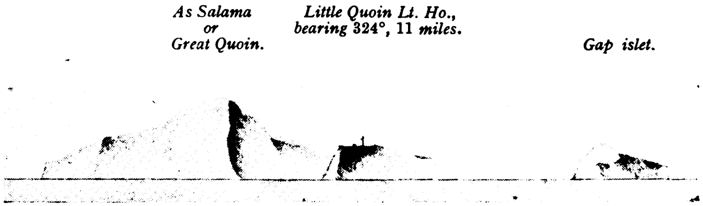
Shīsha (Shisah) is a small village standing on the western side of the southern part of the bay; there is a larger village about 1⅜ miles north-westward of it.

Coast.—Ras al Bab, the north-eastern extremity of Masandam peninsula, is a vertical limestone cliff, 453 feet ($138^{m}1$) high, situated about 2¾ miles northward of Ras Qabr al Hindi, the intervening coast forming a bay. This headland, and the islands and islets off the northern end of Masandam peninsula have been undermined in places for a considerable distance by the action of the sea.

Fakk al Asʻad, a strait 3 cables wide, separates Jazīrat Masandam from Ras al Bab; it is deep and clear of dangers. The strait is

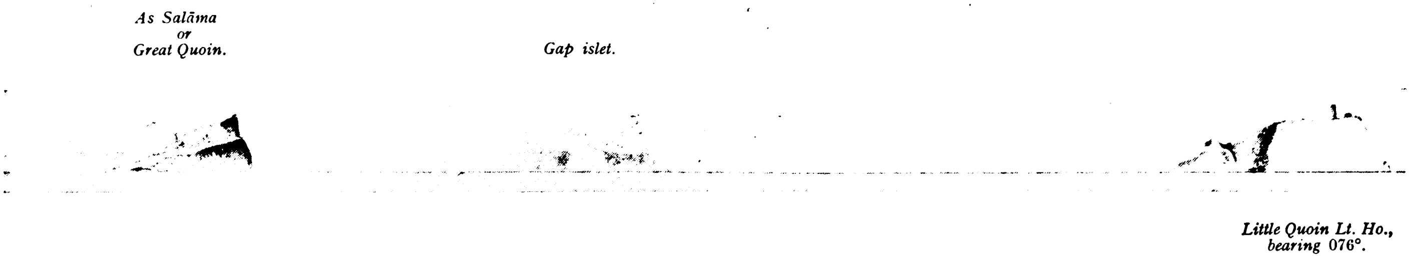
Charts 2851, 2837, 2858, 748b.

To face page 88


As Salama
or
Great Quoin.
Little Quoin Lt. Ho.,
bearing 324°, 11 miles.
Gap islet.

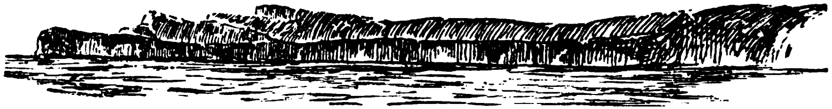
As Salāma wa Banāt-hā from southward.

(*Original dated* 1946.)



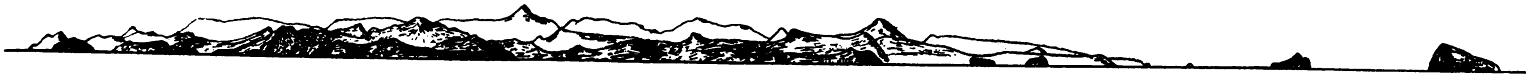
As Salāma wa Banāt-hā from westward, distant about 8 miles.

(*Original dated* 1946.



Ras Tīz from south-westward.

(*Original dated* 1920.)


Kaisa peak.
Ras Qabr al Hindi.
Karni Sibi.
Jazīrat Masandam.
Jabal al Harīm.
Jabal Ma'īli.
Jabal Shamm.
Tawakkul.
Jazīrat Kun.
Jabal Fine.
Jazīrat Abu Sir.
Little Quoin Lighthouse,
bearing 225°,
9½ *miles.*
Gap islet.
As Salāma.

Masandam peninsula from north-eastward.

(*Original dated* 1931.)

Chart 753.

frequently used by steam vessels, but great attention must be paid to the helm, and the vessel must be kept in as near mid-channel as possible. Owing to the strong tidal streams and baffling winds, it is not safe for sailing vessels. The north-west-going tidal stream sets against the cliffs on the western side of the strait, and the south-east-going stream on to the south-western part of Jazīrat Masandam.

Islands and danger.—Jazīrat Masandam (Musandam), 889 feet ($271^{m}0$) high, is precipitous all round, except in three or four small coves on its eastern side, where are the only landing places. The highest part is near the southern coast, and is in the form of three small peaks. (*See* view D on chart 2851). The island is inhabited. Ras Masandam (Musandam) (*Lat. 26° 23′ N., Long. 56° 32′ E.*), the northern extremity of Masandam, is a cliff about 100 feet ($30^{m}5$) high.

Kachalu or Abu Sufur is a rocky islet in the form of a pillar, 98 feet ($29^{m}9$) high, lying about half a mile north-eastward of Ras Masandam with a clear passage between it and the cape.

Tawakkul, an islet, known to the fishermen as Abu Raschid, lies about 1¾ miles north-westward of Ras Masandam; it is 453 feet ($138^{m}1$) high, steep-to, and precipitous; in appearance it much resembles As Salama (*see* below and view D on chart 2851).

Rig Suwaik, a rocky patch, with a least known depth of 4 feet ($1^{m}2$), and steep-to, lies about three-quarters of a mile westward of Tawakkul. Kachalu, bearing more than 108°, and open northward of Tawakkul, leads northward of the patch.

As Salāma wa Banāt-hā.—Light.—Radiobeacon.—As Salāma wa Banāt-hā is a group of three islets, also known as the Quoins. *See* views facing page 88 and view A on chart 2837.

Little Quoin, about 4¾ miles northward of Kachalu, is 168 feet ($15^{m}2$) high, and is wedge-shaped; the highest and vertical part is at its southern end, and its northern extremity is also a bluff, but smaller. Landing can be effected only on the northern side of the islet, where there is a small stone jetty with a depth of only about one foot ($0^{m}3$) alongside. A reef, over which there are depths of from 12 to 36 feet ($3^{m}7$ to $11^{m}0$), extends about 2 cables northward from the islet.

A light is exhibited, at an elevation of 196 feet ($59^{m}7$), from a white, framework tower, 79 feet ($24^{m}1$) in height, situated on the summit at the southern end of Little Quoin. A radio beacon transmits from this lighthouse.

Gap islet, 247 feet ($75^{m}3$) high, rises in the form of a peak about one mile north-north-westward of Little Quoin; it is cliffy on all sides.

A small rocky patch, over which the least known depth of 8 feet ($2^{m}4$), lies between Gap islet and Little Quoin, about 3 cables from the former.

As Salāma or Great Quoin is 541 feet ($164^{m}9$) high and lies about three-quarters of a mile west-north-westward of Gap islet; it is wedge-shaped with the vertical side at its south-eastern end; landing can be effected only on its north-western side. A reef, over which there are depths of from 24 to 36 feet ($7^{m}3$ to $11^{m}0$), extends about 2 cables northward from the islet.

A small detached above-water rock lies less than half a cable from the northern side of As Salāma.

Tidal streams.—In the vicinity of As Salāma wa Banāt-hā, the

Charts 2851, 2837 2858, 748b.

Chart 753.

tidal streams set north-westward on the rising tide and south-eastward on the falling tide, at a rate of from 3 to 4 knots at springs (*see* page 287). Near Kachalu and Tawakkul the streams are strongest, causing broken water; in calm weather, at springs, the noise of the races, caused by these streams, can be heard at a considerable distance.

Northern and western sides of Masandam peninsula.—Anchorage.—Dangers.—Mountains rise steeply from the northern and western coasts of Masandam peninsula, which are everywhere clear of dangers.

Westward of Ras al Bab (page 88) the northern coast is indented by several bays in which there are considerable depths. Ghubbat al Khouse or Khōr Fakudda, the largest bay, is entered between two narrow cliffy points, about 1¾ and 3 miles west-south-westward of Ras al Bab; all its sides are precipitous; about 8 cables south-eastward of the northern entrance point is a stack, 146 feet ($44^{m}5$) high, which lies about half a cable off the coast with which it is connected at low water. In Khōr Ma'īli (Muaili), the bay next westward, there is a sandy beach at its head, on which are a few huts.

Jabal Ma'īli (Muaili), a sharp peak, rises to an elevation of 1,891 feet ($576^{m}4$) immediately southward of the head of Khōr Ma'īli; on southerly bearings its eastern side appears to overhang slightly.

Jazīrat Kūn, about 2 miles west-north-westward of Ras al Bab, is 734 feet ($223^{m}7$) high; except for small beaches on its northern and southern sides, its sides are precipitous, and in the middle there is a depression forming a kind of saddle. It is known to the fishermen as Jazīrat al Khail. *See* view D on chart 2851.

Kumzār (*Lat. 26° 20′ N., Long. 56° 24′ E.*) is a fishing village in a valley or gorge about 2 miles north-westward of Jabal Ma'īli; it stands at the head of Khōr Kumzār, a bay entered about one mile westward of Khōr Ma'īli; this bay is deep and open to the nashi, which often blows hard in the winter.

In 1937, H.M.S. *Fowey* obtained good anchorage, sheltered from the shamāl, in a depth of 23 fathoms ($42^{m}1$), one mile north-north-eastward of Kumzār.

Jabal Aalam, with a double summit over a precipice, rises to an elevation of 1,843 feet ($561^{m}7$) about 8 cables southward of Kumzār. Ras Mukhālif is the northern extremity of the projecting point on the western side of Khōr Kumzār.

Jazīrat Abu Chīr (Sir) or Jazīrat Fujar is a cliffy islet lying about 2½ cables northward of Ras Mukhālif; near its southern end is a peaked hill, 446 feet ($135^{m}9$) high. Bab Mukhālif, the strait between the point and the islet, is deep, but near its northern side is Katu, a precipitous rock, 235 feet ($71^{m}6$) high; the tidal streams through the strait are strong and form eddies.

Mushkan, a group of detached white rocks lying close together and about 15 feet ($4^{m}6$) high, lie about 6 cables north-north-westward of Jazīrat Abu Chīr. The passage between the islet and the rocks is deep.

Between Ras Mukhālif and Ras Sharaita, about 2¼ miles north-westward, are three coves all open northward, in which the depths are considerable. At the head of the eastern cove is a small natural boat harbour. The middle cove is named Khōr Kultē; the eastern one, Khōr Khouran; and the western one, Khōr Fordha.

Charts 2851, 2837, 2858, 748b.

Chart 753.

In 1949, H.M.S. *Loch Quoich* passed through Fakk al As'ad (page 87), thence southward of Jazīrat Kūn and through Bab Mukhālif, and thence westward between Ras Sharaita and Makhbuk (page 91); the passage was found to be deep and clear.

Chart 3452, Khor Kuwai anchorage.

Ras Sharaita is the northern extremity of a promontory, on the southern and highest part of which is a round hill, 405 feet ($123^{m}4$) high; except where it is joined to the mainland by a short sandy isthmus, about 20 feet ($6^{m}1$) high, the sides of the promontory are precipitous.

Makhbuk, a conspicuous, perforated rock, lying about three-quarters of a cable northward of Ras Sharaita, is 78 feet ($23^{m}8$) high, and has vertical sides. The channel between them is clear of dangers and better for small craft than the passage outside where there are always overfalls, but the tidal streams in the channel are strong.

Rig Sharaita, over which there is a depth of 13 feet ($4^{m}0$), lies about 3 cables north-north-eastward of Ras Sharaita.

In 1948, depths of from 21 to 34 fathoms ($38^{m}4$ to $62^{m}2$) were reported between 2½ and 4½ miles west-north-westward of Tawakkul; the bank is not yet defined.

Chart 753.

Strait of Hormuz.—The Strait of Hormuz lies between the western and northern sides of Masandam peninsula, and its off-lying islets, and the eastern part of Qishm island (page 106).

Chart 3452.

Khōr al Quwai'.—Light.—Dangers.—Khōr al Quwai' (Kuwai) is the strait between the western side of the northern end of Masandam peninsula and Jazīrat al Ghanam; it is deep in the fairway and has a least width of about 2¾ cables.

Jazīrat al Ghanam lies with Khartum Taisar, its northern extremity, about 1½ miles south-westward of Ras Sharaita. At the northern end of the island is a hill 209 feet ($63^{m}7$) high, which is joined to the main part of the island by a low sandy neck about 1½ cables wide; thence the land gradually rises to an elevation of 606 feet ($184^{m}7$) near the southern end of the island, which terminates in a sheer cliff 350 feet ($106^{m}7$) high. The island is barren, waterless, and uninhabited, except for the caretaker of a radio station and a small Arab maintenance staff.

Ras Salib (*Lat. 26° 22′ N., Long. 56° 22′ E.*), a rocky projection, from 30 to 40 feet ($9^{m}1$ to $12^{m}2$) high, resembling a pier, is the western entrance point of the northern end of Khōr al Quwai'. A reef, which dries, extends about three-quarters of a cable from the southern side of Ras Salib. There are several radio towers and a water tank in the vicinity of Ras Salib.

A light is occasionally exhibited, at an elevation of 50 feet ($15^{m}2$), from a mast on a stone dwelling situated on Ras Salib.

A reef, which dries one foot ($0^{m}3$), extends about 1¼ cables from a position on the eastern side of Jazīrat al Ghanam, about 3½ cables south-westward of Ras Salib light-structure.

There are several small beaches on both sides of Khōr al Quwai', the best landings being on Salib beach, on the southern side of Ras Salib, and at Sifa Lehsa, on the mainland nearly opposite it. There is a stone pier at Salib beach, with a depth of 4 feet ($1^{m}2$) at its head.

Charts 2851, 2437, 2858, 748b.

Chart 3452.

Khōr Zinzan is a small inlet on the eastern side of Khōr al Quwai' about one mile within its northern entrance. Goats, eggs and fish are obtainable.

The shores of Khōr al Quwai' appear to be uninhabited, but there is a small village, Hel Samesim, up in the hills above Khōr Zinzan.

The southern entrance of Khōr al Quwai' is on the northern side of a bay in the north-eastern, south-eastern and southern corners of which latter are three coves.

Khōr Gharam (Ghurum), the northernmost of the three, has a deep gorge at its head, at the mouth of which are some date plantations, and a few fishermen's huts. Khōr Bustan, the south-eastern, is a bight on the eastern side of Ras Qabba (Kabba), at the head of which is the little village of Qabba (Kabba). During the summer both these villages are almost deserted.

Chart 3452, Khor Kuwai anchorages.

Khōr Jum, the southern cove, lies on the western side of Ras Qabba. The cliffs on the western side of the cove rise to a height of 350 feet (106^{m}7) at Ras Khtaima, the western entrance point.

A rock, over which there is a depth of less than 6 feet (1^{m}8), lies about a quarter of a cable off Karni El-thour, the southern extremity of Jazīrat al Ghanam.

Anchorages.—Directions.—A safe anchorage may be obtained as convenient in Khōr al Quwai', in depths of from 13 to 17 fathoms (23^{m}8 to 31^{m}1), sand, gravel, and soft or broken coral. The strait should be entered from northward, and care must be taken to allow for the tidal streams in the approach. On account of the eddies in the strait on the north-going stream, and also of its rate, vessels should not anchor within about three-quarters of a mile of the southern entrance; the eddies are also strong about half a mile southward of Ras Salib.

In 1939, a white mark, not shown on the chart, was painted on the eastern side of the strait, in a position 174° from Ras Salib light-structure (*Lat. 26° 22′ N., Long. 56° 22′ E.*), distant 1·35 miles; from northward it appears as two white patches, the left hand one of which should be used.

In 1916, H.M.S. *Cyclamen* obtained good anchorage in Khōr Bustan, about 3 cables eastward of Ras Qabba. In this position the tidal streams were almost inappreciable.

Tidal streams.—The tidal streams in the northern approach to Khōr al Quwai' set east-north-eastward and west-south-westward; in the strait they set northward and southward at a maximum rate of 2 knots; in addition, there is normally a north-going current of from one to 2 knots.

It was reported, in 1939, that on two occasions the south-going stream began at about the time of high water, ran in that direction for 3 hours and then set northward until the following high water.

In the Khōr itself, the streams normally run northward and southward, but inshore there is a back eddy which runs in the opposite direction; this is most useful for pulling boats making their way about the Khōr.

Chart 3452, plan of Khasab bay and Khor ash Shumm.

Khōr Ghubb 'Ali.—Anchorage.—Khōr Ghubb 'Ali, on the south-western side of Masandam peninsula, is entered between a point,

Chart 3452, plan of Khasab bay and Khor ash Shumm.

situated about 1¼ miles south-south-westward of Ras Khtaima, and a point about one mile farther southward. These points consist of cliffs about 650 and 300 feet ($198^{m}1$ and $91^{m}4$) high, respectively, and that on its northern side rises to a conical hill 1,168 feet ($356^{m}0$) high.

Hassa Halima is a rock which dries 2 feet ($0^{m}6$), and lies about half a cable offshore, one cable northward of the northern entrance point.

Ghubb 'Ali is a small village near a sandy beach at the head of the inlet; near it are a few trees.

There is anchorage, in a depth of 13 fathoms ($23^{m}8$), sand, at the head of Khōr Ghubb 'Ali with the 1,106-foot ($337^{m}1$) summit, about 3 cables south-eastward of the village, bearing 134°, distant 8 cables.

Coast.—Shamm (Shumm) peninsula separates Khōr Ghubb 'Ali from Khōr ash Shamm; its western side is cliffy. The village of Hassa stands close to the sandy beach at the head of the inlet, about 2¾ miles southward of the southern entrance point of Khōr Ghubb 'Ali.

Jabal Shamm (Shumm), a remarkable peak rising to an elevation of 2,921 feet ($890^{m}3$) with a high precipice on its south-eastern side, is situated on Shamm peninsula about 1¼ miles north-north-eastward of its southern extremity. *See* view D on chart 2851.

Karni Sibi (*see* page 87), situated at the head of Khōr ash Shamm, is a good mark from seaward when off Khōr Ghubb 'Ali; from that direction its summit is shaped like a sugar-loaf and it appears to be at the head of that inlet.

Khōr ash Shamm.—Dangers.—Khōr ask Shamm (Shumm), is entered between the western side of Shamm peninsula and Ras Shakhs, about 2¼ miles north-westward of the southern extremity of the peninsula; it is backed by precipitous mountains and is accessible only by a narrow and winding entrance that is scarcely perceptible at a short distance offshore. Its shores are deeply indented and in it are several islets. Its southern and eastern shores are formed by the the Wali Akbar isthmus which connects the promontory of Ruūs al Jibāl with Masandam peninsula. In the entrance the tidal streams at springs are strong.

Ras Shakhs (*Lat. 26° 13′ N., Long. 56° 17′ E.*) is a cliff about 150 feet ($45^{m}7$) high. A spit, with a depth of 19 feet ($5^{m}8$) over its outer end, extends about 3 cables northward from this point. Al Jubba, an islet, 194 feet ($59^{m}1$) high, lies close northward of the point on the western side of Khōr ash Shamm, about 6 cables south-south-eastward of Ras Shakhs. Jazīrat Seghir, 48 feet ($14^{m}6$) high, lies in the entrance to Khōr Maqlab, on the southern side of the main inlet, about 1¼ miles eastward of the southern extremity of Shamm peninsula; on it are the ruins of a telegraph station. A pinnacle rock, with a depth of 7 feet ($2^{m}1$), lies about one cable north-westward of Jazīrat Seghir. Jazīrat Shamm (Kebir) lies about 3 cables north-north-eastward of Jazīrat Seghir, and close off the southern shore of the main inlet.

Ras al Hattm, on the northern side of the main inlet, about 3¼ miles east-north-eastward of the southern extremity of Shamm peninsula is 207 feet ($63^{m}1$) high.

Humsi (Hamsi) is a small village standing at the head of the cove which is entered between Ras Shakhs and Al Jubba. Nadhīfi is a small village on the southern side of the cove, about 1¾ miles south-south-eastward of Al Jubba. The landlocked head of this cove is

Charts 753, 2851, 2837, 2858, 748b.

Chart 3452, plan of Khasab bay and Khor ash Shumm.

a convenient place for grounding a vessel. Khōr Maqlab (Maklab) is separated from the cove in which Nadhīfi is situated by a high rocky point; the hills on the south-western side of the bay are high and steep.

Shamm village is situated near the head of a cove on the northern side of Khōr ash Shamm, which is entered about 1½ miles north-eastward of the southern extremity of Shamm peninsula. Mida (Maddeh) village stands at the head of the cove, which is entered on the eastern side of Ras al Hattm.

The village of Sibi, the largest in the vicinity, is situated, close south-westward of Karni Sibi on a sandy beach at the head of a deep cove in the south-eastern corner of the inlet.

Anchorage.—The best anchorage in Khōr ash Shamm is reported to be southward of Jazīrat Seghir; but, in 1923, H.M.S. *Cyclamen* anchored in a depth of 15 fathoms (27^{m}4) about 9 cables northward of the islet.

Chart 753.

NORTH-WESTERN SIDE OF RUŪS AL JIBĀL.—Aspect.—The northern and western coasts of Ruūs al Jibāl promontory rise steeply to the mountains, and there are no off-lying dangers.

From northward, except when very close inshore, Jabal al Harīm, with its small table-top (page 84), is visible over the other mountains. Jabal Fine (page 95) is situated about 8 miles north-north-westward of Jabal Sha'm, but does not show up well against the mountains rising to the latter when bearing between about 140° and 170°.

Chart 3452, plan of Khasab bay and Khor ash Shumm.

Coast.—Between Ras Shakhs and Ras Neikhi, the eastern entrance point of Dōhat Khasab, about 1¼ miles west-south-westward, the northern coast of Ruūs al Jibāl is high and rocky; between these points there are two coves, the eastern and larger of which is Khōr Fanakha (Fenekha), at the head of which there is a village.

Dōhat Khasab.—Anchorage.—Tidal streams.—Dōhat Khasab is entered between Ras Neikhi (*Lat. 26° 13′ N., Long. 56° 16′ E.*) and Ras il Khumi, a rocky point with a small square ruined tower on it, 1¼ miles west-south-westward. At the head of the bay, where a sand bank dries out about half a mile, is the town of Khasab, standing in a date grove which extends up a wide valley running southward with bare steep hills rising on either side; beyond the date grove the valley is cultivated. Little of the town is visible from seaward, with the exception of a fort which stands with its flagstaff near the middle of the beach (*see* view facing page 96). The Wali of the Sultan of Muscat resides in the fort; but the Shaikh's house is situated about half a mile inland and is not visible from seaward. Bullocks, goats, some eggs and oranges are obtainable.

The best landing at high water is on the western end of the beach, and boats approaching it should keep along the western shore of the bay; at low water it is best to keep just eastward of the Wali's fort and follow up the creek which runs along its western wall.

Anchorage may be obtained in Dōhat Khasab, but it is open northward to the strong winds which blow in winter from that direction, though they occur very rarely and are of short duration. In summer, vessels should anchor in a depth of about 7 fathoms (12^{m}8), fine sand; but in winter they should not get into depths of less than

Charts 2837, 2858, 748b.

Chart 3452, plan of Khasab bay and Khor ash Shumm.

10 fathoms ($18^{m}3$); the holding ground is good. When the shamāl is blowing at sea, the wind in the bay is south-westerly, and the bay is then well sheltered from wind and sea. In 1931, H.M.S. *Penzance* anchored, in a depth of 3 fathoms ($5^{m}5$), sand, with the fort bearing 171°, distant 6 cables.

The tidal streams at the inner anchorages are reported to be variable in direction and of moderate strength, but farther offshore they attain a greater rate.

Coast.—Khōr Qida (Kidah) is entered between Ras Salti Aleh, about half a mile west-north-westward of Ras il Khumi, and Ras ar Rakham, about 6 cables farther westward. It is separated from Dōhat Khasab by a ridge of steep hills. Qida, a small village with a large date grove, stands on the shore at the head of the cove; Makhi, a large fishing village, is situated on the western side of the cove near its entrance.

In 1933, H.M.S. *Fowey* anchored in a depth of 8 fathoms ($14^{m}6$) opposite Makhi, about 8½ cables from the head of the cove.

Khōr Hana is entered westward of Ras Ruba, about one mile northward of Ras ar Rakham; on its shores are a few huts and a fine date grove.

During the shamāl, the wind here blows from west-south-west or west, and sheltered anchorage may be obtained, in depths of from 19 to 22 fathoms ($34^{m}7$ to $40^{m}2$), with Ras Shaikh Mas'ūd, situated about 1½ miles northward of Ras Ruba, bearing about 306°, distant 1½ miles.

In 1934, H.M.S. *Fowey* anchored off Khōr Hana with Ras Shaikh Mas'ūd bearing 331°, distant about 1¼ miles; there was little shelter from the shamāl in this position, as the wind blew down a gulley in the hillside and reached the mouth of the cove with redoubled force.

Charts 3452 plan of Khasab bay and Khor ash Shumm, 753.

Ras Shaikh Mas'ūd is a prominent headland, the northern extremity of which is composed of cliffs about 50 feet ($15^{m}2$) high and from it the land rises gradually to Jabal Fine (*Lat. 26° 06′ N., Long. 56° 11′ E.*). This peak, 4,534 feet ($1382^{m}0$) high, is situated about 9½ miles southward of Ras Shaikh Mas'ūd and from eastward or westward appears as a regular cone; but when seen from northward has a rounded top. (*See* view D on chart 2851). The long slope on its northern side is very prominent from westward. There are two small bights at the northern extremity of the point with white sandy beaches; on the beach, in the eastern bight, is the tomb of the Shaikh after whom the point is named. On the western side of the point, about one mile from its extremity, is Khōr Aida, a small bight.

Tidal streams.—The tidal streams eastward of Ras Shaikh Mas'ūd are weak; but north-westward of a line joining that point and the northern end of Jazīrat al Ghanam they set south-westward on the rising tide and north-eastward on the falling tide at a rate of from 1½ to 2 knots.

For tidal streams in mid-channel between Ras Shaikh Mas'ūd and Jazīrat Henjām, about 28 miles north-westward, *see* page 288.

Chart 753.

Coast.—Anchorage.—Between Ras Shaikh Mas'ūd and Ras al Jādi, about 2¼ miles south-south-westward, the coast is bordered

Charts 2837, 2858, 748b.

Chart 753.

intermittently by cliffs that increase in height, until at the latter point, there is a bold cliff, 909 feet ($277^{m}1$) high, which is prominent from north-westward and south-westward.

The coast south-westward of Ras Shaikh Mas'ud is open to the shamāl, from which no shelter can be obtained; a vessel at anchor off this stretch of coast should therefore proceed to sea as soon as there are indications that it is about to blow.

Jirri, situated at the foot of the hills about one mile southward of Ras al Jādi, is a small fishing village standing on a beach which extends as far as Bakha, a village about 4½ miles south-south-westward. The village of Jādi stands about 3¼ miles south-south-westward of Jirri, and between them are some date trees.

Bakha stands on the shore of a small bight, the western entrance point of which projects slightly from the general line of the coast. The bight is open northward and depths of 3 fathoms ($5^{m}5$) extend about 7 cables from the beach; but there are depths of from 5 to 10 fathoms ($9^{m}1$ to $18^{m}3$) about 1½ miles north-westward of the bight. There are four forts at Bakha, one of which is in ruins; the second, is a square fort, also in ruins but with a watch tower still standing, situated on a hillock about half a mile eastward of the village; the third, the position of which is indicated on chart 753, is a large fort at which the Shaikh's flag is displayed, and is situated at the foot of a hillock, but is not easily identified from seaward as its colour blends exactly with that of the hillock; the fourth, and most remarkable, stands on the western entrance point of the bight, the tower at one of its angles being higher than the others. Inland of the village is a cultivated plain and some date groves.

Anchorage has been found, in a depth of 22 fathoms ($40^{m}2$), with the western fort bearing 141°, distant about 1¼ miles; in this position the tidal streams set parallel with the coast.

Between Bakha and Ras ash Sha'm, 6½ miles south-south-westward, the coast is steep-to and rocky, interspersed with small sandy beaches. Fadhgha (Fudar), Ghamdha (Ghamtha), and Tībāt (Tibba) are fishing villages on the beaches, about 2½, 3½, and 4½ miles, respectively, south-south-westward of Bakha, with a few date trees near each.

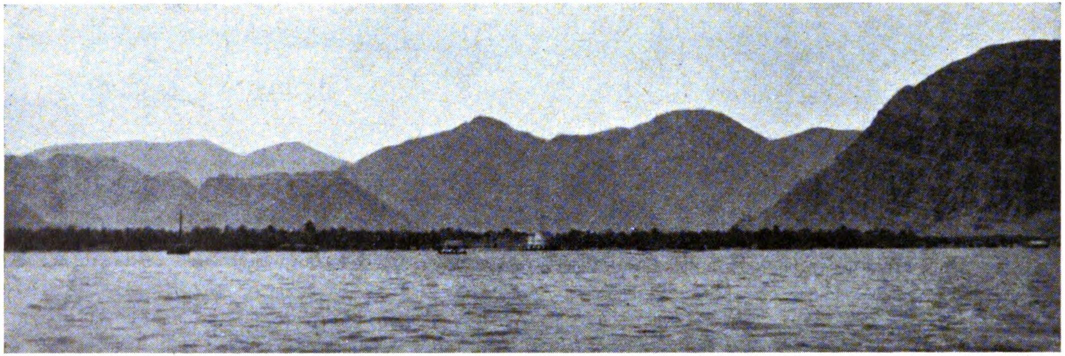
Ras ash Sha'm (*Lat. 26° 03' N., Long. 56° 05' E.*) rises gradually to the summit of a mountain, about 2,500 feet ($762^{m}0$) high, 2 miles inland, which has a notch in it and is a good mark from south-westward and northward. From Ras ash Sha'm, the range of mountains forming the western side of Ruūs al Jibāl trends southward, but the coast of Trucial 'Oman (*see* page 154) extends south-westward becoming low and characteristic of the whole of the southern shore of the Persian gulf.

COAST OF BĪĀBĀN.—General remarks.—The coast of this district of Persia lies on the eastern side of the entrance of the Persian gulf between Mīnāb at the northern end and Jāsk at the southern. Ranges of mountains rise some distance inland and in clear weather are good marks. There are a few villages and towns on this coast. The district is thinly populated, the inhabitants are poor and mostly live in huts, those on the coast being fishermen.

No supplies are to be obtained.

The coast is very low, and a plain of varying width extends inland

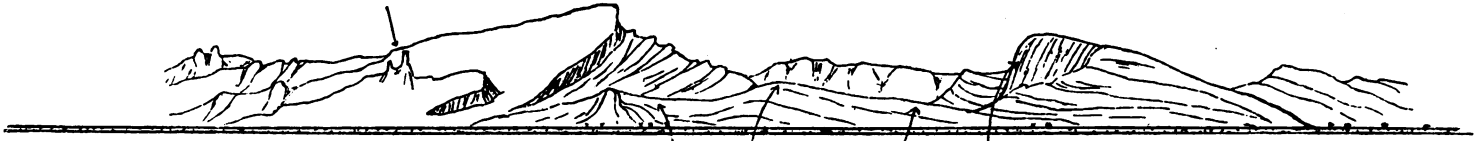
Charts 2837, 2858, 748b.



Wali's fort, bearing 200°, *distant* 3½ *cables.*

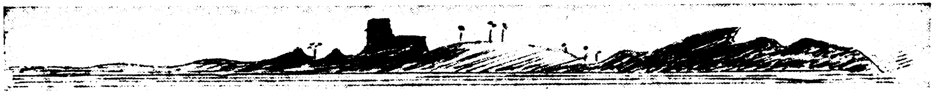
Khasab.

(*Original dated* 1933.)


Natural rock pillar.
Parkau, bearing 338°, 18 miles.
Low coastal range.
Distant range.
Perpendicular cliff. Kūh Gaigan.

Mountains northward of Ras Jāsk, from Jāsk bay.

(*Original dated* 1922.)


Fort, bearing 026°, 6 miles.

Kūhistak from south-south-westward.

(*Original dated* 1910.)

Chart 753.

to the foot of the mountains. A feature of the district is the *Mins,* or dangerous quicksands, formed by the sun drying the surface ground while the soil below remains in a semi-fluid condition; they occur chiefly upon the coast between the firm damp strip near the water's edge and the soft dry ground farther inland.

The coast is imperfectly known and must be approached with great caution for in most places there are considerable depths close to the outer edge of the coastal bank and soundings afford but little warning. The coast is visible only a short distance, and care must be exercised, owing to the appearance of the high land in the background, to avoid over-estimating the distance of the vessel from it.

There is no shelter from the shamāl, and anchorage off the coast is bad.

Coast.—Aspect.—The coast between the entrance to Jāsk creek and Ras al Kūh, about 27 miles west-north-westward, is low and sandy with tufts of grass; there are several shallow creeks which at times connect the mangrove swamps behind the coast with the sea; at some distance inland are some date groves.

Khōr Hamād, the most important of these creeks, is used by native craft; its mouth is situated about 8 miles eastward of Ras al Kūh, and into it flows Gangān rūd.

Several prominent mountains and hills in this vicinty are visible from seaward long before the coast.

Kūh Gaigan (Jabal Dangiya), between which and Kūh-e Loh is a great valley, is an isolated peak, rising to an elevation of 1,630 feet ($496^{m}8$) about 12½ miles northward of Ras Jāsk; its western side forms a great bluff which, except from westward when it is less remarkable, shows up well against the background of mountains.

Parkau (Kūh Bahmadi), the summit of which rises to an elevation of over 3,000 feet ($914^{m}4$) 7 miles north-westward of Kūh Gaigan, is separated from the latter by a gap with precipitous sides; Parkau (*Lat. 25° 56′ N., Long. 57° 38′ E.*) has a long slope on its western side and a very serrated crest; on its southern slope is a natural pillar of rock about 3¾ miles north-westward of Kūh Gaigan. (*See* view facing this page, and view E on chart 2851). From Parkau the mountains trend north-north-westward with a valley between them and the coastal ranges.

Zīr kūh (Jabal Khōr Hamād), the eastern end of which is situated about 9 miles westward of Kūh Gaigan and 4 miles inland, is a ridge about 300 feet ($91^{m}4$) high, with cliffs on its southern side, extending about 2 miles westward.

Dangers.—Caution.—The coastal bank, with depths of less than 3 fathoms ($5^{m}5$), extends in places about 1½ miles offshore between Jāsk bay and Ras al Kūh.

A shoal named Gahha, a small 1½-fathom ($2^{m}7$) soft patch which is steep-to, lies about 3 miles offshore, about 16 miles west-north-westward of Ras Jāsk.

A bank, over which there is a depth of 10 fathoms ($18^{m}3$), lies about 4¾ miles offshore and about 10½ miles south-eastward of Ras al Kūh.

Between Ras Jāsk and Ras al Kūh, a vessel should not approach within depths of less than 27 fathoms ($49^{m}4$) when in the vicinity of Gahha shoal.

Charts 2851, 2837, 2858, 748b.

Chart 753.

Coast.—Anchorage.—Ras al Kūh is very low; the coastal bank, with depths of less than 3 fathoms ($5^{m}5$), extends half a mile offshore, the outer edge being steep-to; the point should therefore be given a good berth, especially at night. The coast is bordered by a sandy beach with tufts of grass, within which the land is swampy for several miles. A small creek, the entrance to which is close north-westward of the point, is frequented by native craft; drying sands extend about 3 cables from its mouth. Mugmālam, a small village with a date grove, is situated about 3 miles north-eastward of the point.

Kūh-e Mubārak, situated in the swampy plain about 3¼ miles northward of Ras al Kūh and about one mile inland, is a very remarkable isolated rock; it is light in colour, and 333 feet ($101^{m}5$) high; there is a small hole in its upper eastern corner, which appears open from north-westward and south-eastward; except when seen against the light-coloured hills behind, the rock is prominent; from north-eastward and south-westward it looks, when the low land is not in sight, like an outlying rock. *See* view D on chart 753 and view F on chart 2851.

Anchorage may be obtained, in depths of from 6 to 10 fathoms ($11^{m}0$ to $18^{m}3$), from a half to three-quarters of a mile offshore, about one mile south-eastward of Ras al Kūh; but during a shamāl the wind blows from only a little northward of west off the point, and the anchorage is not sheltered from such a wind.

Aspect.—A bluff, about 3 miles inland and 4½ miles north-north-eastward of Kūh-e Mubārak, rises to an elevation of 720 feet ($219^{m}5$); it is part of a light-coloured ridge trending north-north-westward and increasing in height from a position about 2 miles north-eastward of Kūh-e Mubārak. On the western side of this bluff, a white rocky column stands out prominently.

Jabal Karāi (Karya) is a remarkable hill of light colour, 1,910 feet ($582^{m}2$) high, situated in the same ridge as, and about 10 miles northward of, the bluff. When seen from westward it presents a jagged outline but from north-westward or southward it appears as a peak with almost precipitous sides. (*See* view F on chart 2851).

A wedge-shaped hill (*Lat. 26° 00′ N., Long. 57° 16′ E.*), about 6½ miles north-north-westward of the bluff, rises to an elevation of 720 feet ($219^{m}5$) about 1¼ miles from the coast; it is the summit of a comparatively short ridge lying parallel with, and between, the coast and the ridge in which are the bluff and Jabal Karāi; from westward the wedge-shaped hill appears conical in shape.

Zangīak (Jabal Bis) rises to an elevation of 3,970 feet ($1210^{m}1$) about 14 miles east-north-eastward of Jabal Karāi; except from close inshore, when it is obscured by the lower intervening ranges, it is a good mark; from north-westward or southward it appears conical. There is a valley between Zangīak and the ridge in which is Jabal Karāi. *See* view facing page 100.

Northward of Jabal Karāi, the coastal hills trend north-north-westward and are of irregular outline but have no remarkable peaks.

Coast.—Dangers.—Proserpine rock, about 9½ miles northward of Ras al Kūh, and close offshore, is about 70 feet ($21^{m}3$) high, and wedge-shaped, the bluff being at its western end.

A tower stands on the coast about 1¼ miles northward of Proserpine rock, and northward of the tower is a small creek in which the

Charts 2851, 2837, 2858, 748b.

depths are from 2 to 4 feet ($0^{m}6$ to $1^{m}2$). The village of Sarocan is situated at the head of the creek.

Ras ash Shīr is a very low point situated about 4 miles north-westward of Sarocan; there are one or two huts on the point, and flats dry off it for about half a mile. Tūjak is a small village about 2 miles north-eastward of the point.

A flat of sand and mud, over which the depths are less than 3 fathoms ($5^{m}5$), fringes the coast northward of Proserpine rock, and off Ras ash Shīr extends about 3 miles offshore. Ras ash Shīr and the coast northward of it should be given a wide berth, especially at night or in thick weather.

Ras Gunāri (Kunāri) lies about 12 miles northward of Ras ash Shīr and is very low, being partly covered at high water; on the intervening coast are patches of mangroves. The shoal flat of sand and mud gradually decreases in width northward of Ras ash Shīr until off Ras Gunāri its edge lies about 1½ miles offshore.

A detached shoal, over which there is a depth of 4 fathoms ($7^{m}3$), lies about 2½ miles south-westward of Ras Gunāri.

Between Ras Gunāri and Tarū (Turu), a small village, about 20 miles northward, the coast is low, thence for some distance northward there are sand hills on the coast.

Rūd Gunāri (Kunāri) is entered about 6 miles north-north-westward of Ras Gunāri; in 1909, there was a depth of 4 feet ($1^{m}2$) over the bar and about 14 feet ($4^{m}3$) inside. In 1910 the river was ascended in a northerly direction by boats from H.M.S. *Redbreast* for a distance of about 3½ miles; it then appeared to divide into two branches, one flowing from north-eastward and the other from north-north-westward. The banks of the river are low and covered with mangroves. The vicinity of the river appeared to be uninhabited.

About 8 miles farther northward is the entrance to Gaz rūd, which appears to be deep enough for access of coasting craft; a conspicuous double peak rises to an elevation of 585 feet ($178^{m}3$), about 9 miles eastward of the mouth of this river. Bandar Sirīk, a small backwater used by dhows, is situated near a sandy point about 5 miles northward of the mouth of Gaz rūd; its entrance is difficult to identify from seaward as the coast is low with sand dunes on the foreshore. Behind the sand dunes are date groves extending to the foot of the hills. The village of Sirīk is situated some distance inland and is hardly visible from seaward. Landing may be effected about a quarter of a mile northward of Bandar Sirīk. There are numerous date trees in the vicinity of Tarū (Turu) a village (*Lat. 26° 32′ N., Long. 57° 07′ E.*), about 2 miles northward of Bandar Sirīk.

Girau, about 3 miles northward of Tarū, is a small village, at which there is a fort and a date grove, standing about half a mile inland. The fort, though white, is not remarkable from seaward, being situated in the date grove. The sand hills on the coast are from 30 to 40 feet ($9^{m}1$ to $12^{m}2$) high, but in them is a gap which serves to identify the position of the village. The country beyond these sand hills appears to be cultivated. The hills approach within about 3 miles of the coast in the vicinity of Girau.

The villages of Bundrām, Ziyārat (Ziarat), and Kalla are situated about 1½, 4¾, and 6¾ miles, respectively, northward of Girau; near Kalla a low spur of the coastal range approaches the coast. About

Chart 753.

7½ miles northward of Kalla is Kūhistak, a village which may be identified by its fort, from 80 to 100 feet ($24^{m}4$ to $30^{m}5$) high, standing on a small hill close eastward of it; there are some date trees in its vicinity. (*See* view facing page 97).

Tidal streams.—Off the coast of Biābān the tidal streams set northward and southward.

Though weak eastward of Ras al Kūh, the tidal streams attain considerable strength when rounding that point and along the coast northward of it, the rate at spring tides being sometimes as much as 2 knots.

Charts 753, 2837.

BANDAR ʻABBĀS AND APPROACHES.—Aspect.—This town is situated on the northern side of the entrance of the Persian gulf about 45 miles west-north-westward of Kūhistak. It is approached between Jazīreh Hormuz, on the north-eastern side, and Jazīreh Lārak and the eastern end of Qishm island, on the south-western side. The town stands on a bare sandy plain which rises gradually to some hills about 100 feet ($30^{m}5$) high from one to 2 miles inland; farther inland the country becomes broken and reaches elevations of from 500 to 700 feet ($152^{m}4$ to $213^{m}4$); still farther inland it is mountainous.

Chart 2837.

Kūh-e Ginau (*Lat. 27° 25′ N., Long. 56° 10′ E.*), a detached mountain of irregular outline, rises to an elevation of 7,743 feet ($2360^{m}1$) about 15 miles north-north-westward of Bandar ʻAbbās. (*See* view facing page 101).

Khush kūh, about 33 miles north-eastward of Bandar ʻAbbās, rises to an elevation of 8,500 feet ($2590^{m}8$) and is a very prominent feature from the entrance of the gulf; the upper part of the western side of the mountain is a bluff and about 8 miles eastward of its summit there is a remarkable cone about 5,000 feet ($1524^{m}0$) high.

Kūh-e Fārghān (Kūh-i-Fūrgūn), about 42 miles northward of Bandar ʻAbbas, rises to an elevation of 10,780 feet ($3285^{m}7$) and is visible in clear weather through the large valley between Kūh-e Ginau and Khush kūh; in winter it is covered with snow.

Chart 753.

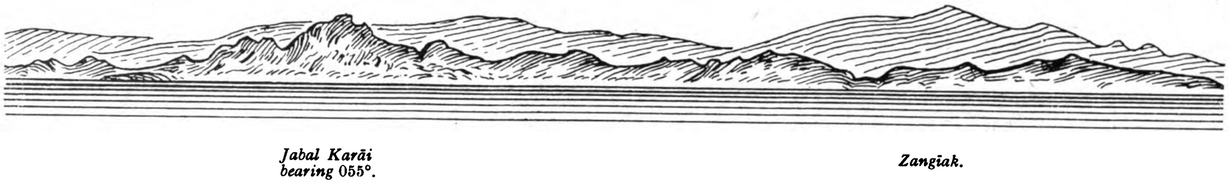
Between Kūhistak and Bandar ʻAbbās, the coast is low and swampy, with mangroves in places. This part of the coast is seldom visited by Europeans. In the vicinity of Kūhistak, the hills recede from the coast, leaving a plain from 10 to 20 miles or more wide, parts of which are fertile. Inland of this plain are high mountains, on the summits of which snow lies for months.

About 20 miles north-eastward of Kūhistak is an overhanging peak or sharp pinnacle of the mountains, about 3,000 feet ($914^{m}4$) high, which from south-south-westward appears as two peaks; it is situated at the southern end of a level-crested range which extends about 6½ miles north-north-westward to a ragged peak of about the same elevation. *See* view facing page 100.

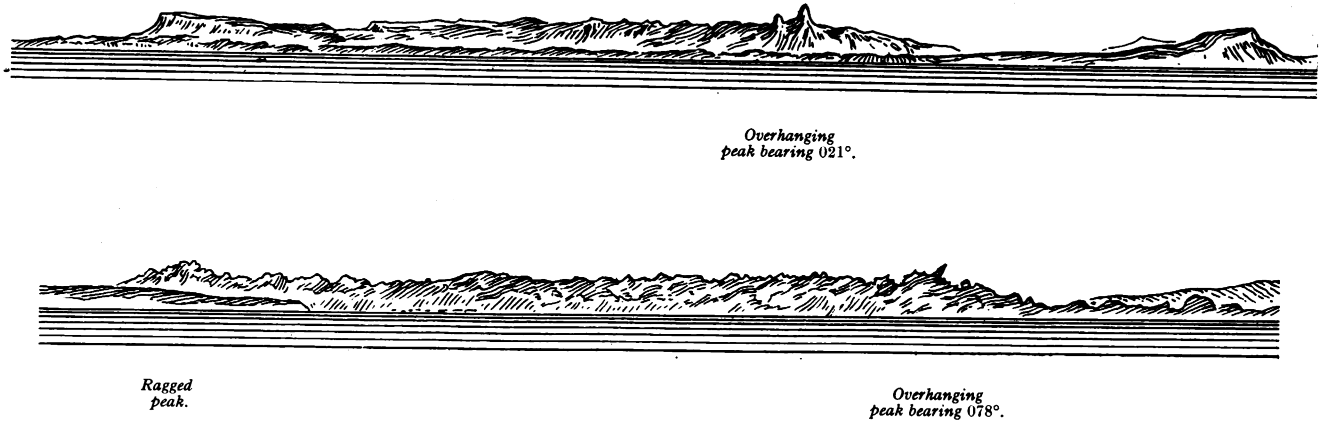
Coast.—Northward of Kūhistak, during a strong shamāl, the wind off the coast blows from west-south-westward and raises a heavy sea. The anchorage off Qishm (page 103) affords the best shelter in this vicinity.

Charts 2858, 748b.

To face page 100.



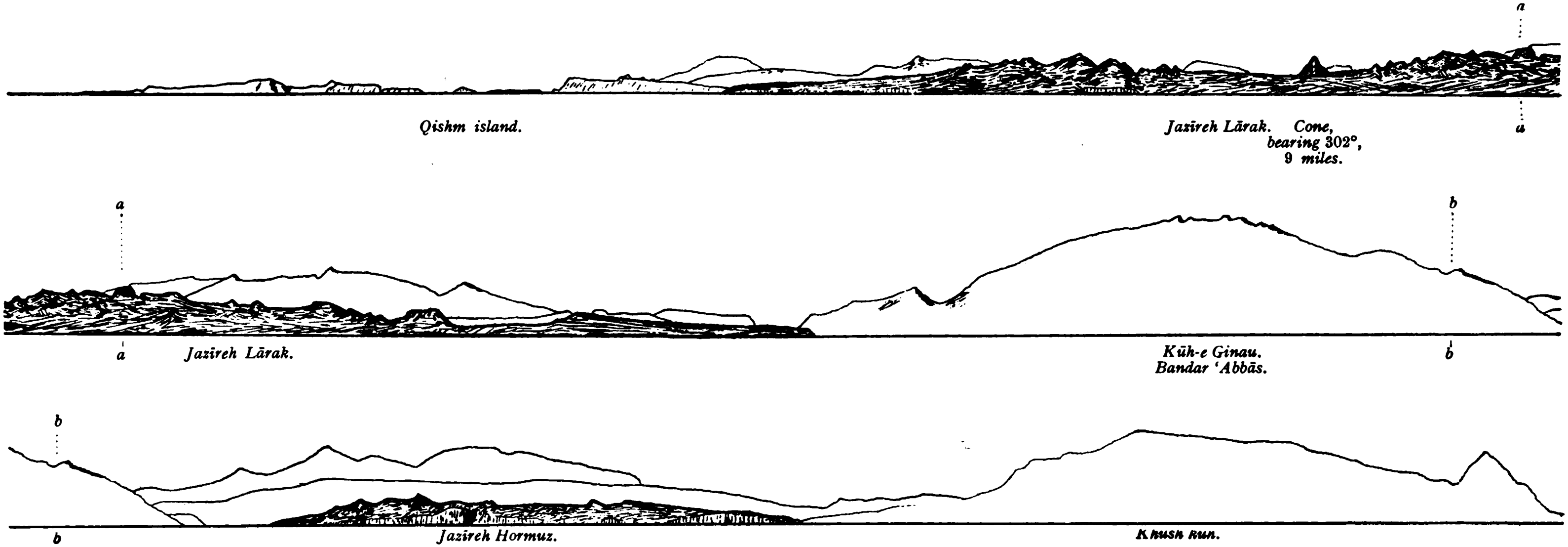
Coast northwards of Ras al Kūh.



Two views of mountains north-north-eastward of Kūhistak.

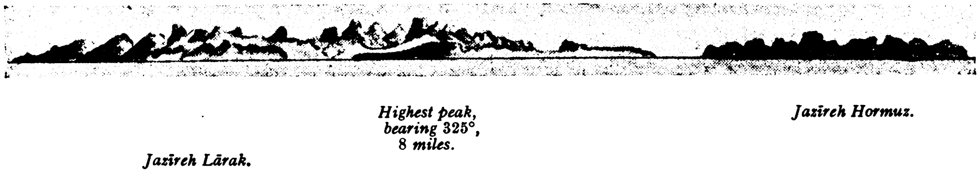
(*Originals dated prior to* 1860.)

To face page 101.



View, in three parts, of approaches to Bandar 'Abbās from south-eastward.

(*Original dated* 1931).


Highest peak,
bearing 325°,
8 miles.
Jazīreh Hormuz.
Jazīreh Lārak.

Jazīreh Lārak and Jazīreh Hormuz from southward.

(*Original dated prior to* 1915.)

Chart 753.

Khargūn (Khagún), a small village about 10 miles north-north-westward of Kūhistak, may be identified by a turtle-backed hillock and some date trees; the land in the vicinity is low and sandy. Close northward of the village is a creek, into which Mazāwi rūd flows, and which affords shelter to boats.

The mouth of Mīnāb rūd is situated about 5½ miles north-north-westward of that of Mazāwi rūd. In ordinary times very little of the water in the river flows into the sea as it is nearly all diverted by irrigation canals.

A detached shoal, with a depth of 5 fathoms ($9^{m}1$), and a bank, with a depth of 10 fathoms ($18^{m}3$), were reported, in 1910, to lie about 5½ miles west-south-westward and 6¾ miles south-westward of the mouth of Mīnāb rūd.

Khōr Mīnāb, a salt water mangrove creek, is entered about 6 miles north-westward of the mouth of Mīnāb rūd and is the port of Mīnāb; it can be entered by small craft of 20 tons and less; but the bar which nearly dries, is impracticable during a shamāl. There are very similar creeks on either side of Khōr Mīnāb. The banks of the river are flooded at high water. Local knowledge is necessary to enter the river.

The town of Mīnāb (*Lat. 27° 09′ N., Long. 57° 05′ E.*) is situated about 13 miles north-eastward of the mouth of Mīnāb rūd; the fort stands on a hill close to the river, and appears large, though very dilapidated. The town is a collection of mat huts; the inhabitants are friendly towards Europeans. The district produces dates, plantains, mangroves, wheat, henna, etc. The exports are dates, henna, wool, and ghī; the imports are principally rice and piece-goods.

The coast west-north-westward of the mouth of Khōr Mīnāb is low and swampy, the eastern portion being covered with mangroves; it is fringed by a mud flat, which extends from one to 2 miles offshore.

Charts 753 and 3599, plan of Jazirat Hormuz anchorage.

Jazīreh Hormuz.—Dangers.—Ras al Masheh, the northern point of this island is the extremity of a plain and is situated about 2½ miles from the mainland about 17 miles westward of the mouth of Khōr Mīnāb. The island is mostly hilly, the hills being about 300 feet ($91^{m}4$) high, with a very rugged outline and marked by a variety of colours; in the centre of the island, a few white peaks, resembling snow-clad hills, rise above the rest, the highest peak attaining an elevation of 690 feet ($210^{m}3$); it has a very sharply-defined summit and a long slope on its eastern side. The hills, with the remarkable exception of the white peaks, and a range near the southern and south-eastern coasts, are chiefly of rock salt with a thin incrustation of various coloured earths; on the eastern coast are a few rocky hillocks; the southern and south-western coasts are cliffy. (*See* views facing this page).

On the northern extremity of the island are the ruins of a Portuguese fort, and about 2 cables southward of it is a minaret, 70 feet ($21^{m}3$) high. Close southward of the fort is the village of Hormuz, a collection of mat huts.

Red oxide is worked in the interior of the island and is shipped near the fort into dhows, for transport to steam vessels which call for that purpose. The north-eastern side of the fort presents a remarkable spectacle from seaward, being coloured a vivid red purple by the dust from the oxide. Landing at the jetty near the fort is not easy as it dries at low water.

The eastern and south-eastern coasts of the island are fringed with reefs extending from 2 to 6 cables offshore.

A shallow flat, over which the depths are less than 3 fathoms ($5^{m}5$), extends about 1½ miles from the western side of the island (*Lat. 27° 03′ N., Long. 56° 25′ E.*).

Euphrates patch, over which there is a depth of 2 fathoms ($3^{m}7$), lies about 2 miles south-westward of the south-western extremity of the island; it is steep-to, except on its north-eastern side which is joined to the flat extending from the western side of the island.

A shoal spit, over which the depths are less than 3 fathoms ($5^{m}5$), extends about 2 miles westward from the Portuguese fort and thence nearly 2½ miles north-north-westward across the western approach to the channel northward of Jazīreh Hormuz.

A spit, with depths of less than 3 fathoms ($5^{m}5$) over it, extends about 6 cables eastward from the northern extremity of the island, and a flat, which dries, extends about 3½ cables northward from the eastern part of the northern coast. The existence of the 3-fathom ($5^{m}5$) patch, charted in a position about 1½ miles eastward of the Portuguese fort, is doubtful.

A shoal, with a depth of 5 fathoms ($9^{m}1$) over it, lies about 2½ miles eastward of the fort.

A flat, with depths of less than 3 fathoms ($5^{m}5$), fringes the mainland opposite Jazīreh Hormuz, and extends offshore to within about one mile of the northern extremity of the island. A spit, with a depth of 3 fathoms ($5^{m}5$) at its outer end, extends southward from the edge of this flat, to a position about 2 miles east-north-eastward of the fort.

Anchorage.—Directions.—Anchorage may be obtained on the northern side of Jazīreh Hormuz (*Lat. 27° 03′ N., Long. 56° 28′ E.*), with the Portuguese fort bearing about 228°, distant half a mile, in depths of from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$), mud; small vessels anchor nearer the village. The anchorage is sheltered, except from the nashi, on the occurrence of which vessels may shift to the western side of the northern point of the island.

This anchorage should be approached with caution as the channel between Jazīreh Hormuz and the mainland has not been thoroughly surveyed.

From a position about one mile eastward of the eastern side of the island a vessel should steer north-north-westward until the Portuguese fort bears 255° whence a westerly course may be steered until it bears 228°; the fort may then be approached on the latter bearing, anchorage being obtained as previously directed.

This channel is used by vessels, calling to load red oxide, with a draught sometimes as much as 25 feet ($7^{m}6$); H.M.S. *Triad* reported in 1924, that, from soundings obtained whilst passing through this channel, it would appear that the least depth in the fairway is about 3¾ fathoms ($6^{m}9$)..

The M.V. *Samcolne*, in 1947, when leaving the anchorage drawing 27 feet ($8^{m}2$), found better water by steering an easterly course about half a mile southward of the track recommended above; the least water obtained, 42 feet ($12^{m}8$), was found with the eastern extremity

Chart 753 and 3599, plan of Jazirat Hormuz anchorage.

of the island bearing 180° and the fort bearing 262° when the vessel altered on to a south-south-easterly course.

To proceed north-westward from the anchorage, a vessel should pass about a quarter of a mile northward of the fort, and bring a ruined chapel on the northern coast of the island open its own width north-eastward of the high south-eastern tower of the fort, bearing 125°, astern; this will carry the vessel through the western channel in a least depth of about 2¾ fathoms ($5^{m}0$); when the high peak of Jazīreh Lārak bears 188°, course may be altered westward or south-westward as requisite.

Tidal streams.—Tidal streams in the anchorage set west-north-westward and east-south-eastward, at rates of from 1½ to 2 knots.

Chart 753.

Jazīreh Lārak.—Anchorage.—This island, the north-eastern extremity of which lies about 9½ miles south-south-westward of the southern end of Jazīreh Hormuz, is generally barren; the highest peak of its rugged hills is square in shape and rises to an elevation of 510 feet ($155^{m}4$). A conical peak, 456 feet ($139^{m}0$) high and situated about one mile south-westward of the highest peak, shows up best from south-eastward and north-westward. There are two table-topped hills close together on the eastern side of the island which show up well from the northward or southward, but are obscured against the hills behind them when viewed from eastward. (*See* views facing page 101).

The coasts of the island, generally, are steep-to; but reefs extend about 4 cables from its western side.

At night, Lārak and Hormuz are very similar in appearance, from south-eastward; but the depths at similar distances are greater south-south-eastward of Lārak than those south-eastward of Hormuz.

On the northern side of Lārak is a low sandy point, nearly 2 miles eastward of which is an old fort and the little fishing village of Labtiyāb.

The island is covered with stunted vegetation, and near the village are some date palms.

Anchorage may be obtained in depths of about 13 fathoms ($23^{m}8$), off the northern coast of Jazīreh Lārak (*Lat. 26° 51′ N., Long. 56° 21′ E.*), between the low point and the village, about half a mile offshore and 3 cables from the edge of drying sands; off the village, the bottom is rock, and there the coastal reef extends offshore for about one cable. The anchorage is sheltered only from the shamāl and is not recommended.

Chart 3599, plan of Qishm.

Qishm.—The town of Qishm, situated on the eastern end of Qishm island (page 103), is well-built and stands on a fairly level, sandy site close to the water's edge; earthquakes, however, have destroyed a great part of it. There is a small date grove on either side of the town and at a short distance southward of it are several domed water reservoirs.

The land behind the town, and southward of it, rises in a gradual slope to a hill, known as Qishm bluff, the northern and western sides of which are precipitous; its flat summit, 560 feet ($170^{m}7$) high, is situated about 3 miles westward of the town (*Lat. 26° 57′ N., Long. 56° 16′ E.*).

Meat or cattle, vegetables, and bread can be obtained.

Charts 2837, 2858, 748b.

Chart 3599, plan of Qishm.

Dangers.—Light-buoy.—Several shoals, over which the depths are from 15 to 18 feet (4^{m}6 to 5^{m}5), sand, lie from one to 1¼ miles offshore eastward and north-eastward of Qishm town; these shoals lie on the coastal bank which extends from the north-eastern end of Qishm island, and are steep-to on their outer edges; off the town the depths shoal rapidly towards the coast. A flat, which dries, extends nearly 2 cables offshore on the northern side of the town, and the coastal bank extends 3 cables from the eastern side; this bank fringes the coast southward of the town, and at 1¼ miles in that direction extends 6 cables offshore with depths of less than 18 feet (5^{m}5).

A light-buoy, exhibiting a *white flashing* light, is moored about 1¼ miles eastward of the fort at Qishm which is a good mark, and marks the southern side of a channel, half a mile wide, in which the depths are about 3¼ fathoms (5^{m}9); this channel leads, between the shoals, to the anchorage.

Anchorage.—Directions.—Anchorage may be obtained anywhere northward of the flat off Qishm; a good position is in a depth of 6 fathoms (11^{m}0), about 1½ miles offshore.

Vessels whose draught will permit them to cross the flat may anchor in a depth of 5 fathoms (9^{m}1), mud, with the fort bearing 180°, distant about three-quarters of a mile.

The anchorage near the town is well sheltered from the shamāl, and the nashi does not raise a heavy sea; but the tidal streams cause a vessel at anchor there to lie broadside on to the prevailing wind and to ride uneasily.

Off the town and over the shoal banks, the tidal streams attain a rate of 2 knots at springs, and cause ripples.

A vessel approaching the anchorage off Qishm should proceed as for Bandar 'Abbās (*see* page 105) until the fort at Qishm bears 210°, when she should alter course to pass between the 2¾- and 3-fathom (5^{m}0 and 5^{m}5) patches north-eastward of the town and thence steer for the anchorage. Or, preferably, when the fort at Qishm situated in the middle of the town, bears 251°, she should steer for it on that bearing passing about 4 cables northward of the light-buoy, and when abreast the light-buoy she should alter course to 300° for the anchorage. In either case caution is necessary.

It is not advisable to approach the anchorage from southward without local knowledge, as, in 1923, the fort was difficult to identify.

Chart 3599, plan of Bandar Abbas.

Bandar 'Abbas.—The town of Bandar 'Abbās is fronted by a beach of firm sand, which dries about one cable from high-water mark; landing on it at low water is bad, and at times the surf is very heavy. The town is of considerable importance, being the distributing centre for several towns in the interior. The town is the seat of the Persian Deputy Governor, who is subordinate to the Governor of the Gulf Ports. In 1952, the population was about 10,000.

There is a pier abreast the middle of the town in front of the Custom house (*Lat. 27° 11′ N., Long. 56° 17′ E.*). The masonry portion of the pier dries and lighters can go alongside only from about 3 hours before until 3 hours after high water; but it has been extended on iron piles, with steps at its head in a depth of about 3 feet (0^{m}9). There is a flagstaff on the pier. In 1946, the pier was in a bad state of repair.

The village of Nāiband is situated about 2½ miles north-eastward of

Chart 3599, plan of Bandar Abbas.

the pier and its vicinity may be identified by a prominent date grove.

Ab-e Mūrgh, immediately eastward of Bandar 'Abbās, and the stream on which Nāiband stands appear to be usually dry.

The old British Consulate is a conspicuous, isolated, grey stone, two-storied building, surmounted by a flagstaff, situated about one mile north-eastward of the pier.

Sūru village is situated about 2 miles west-south-westward of the pier; between them is Khazar mosque, which is conspicuous.

Caution.—Vessels are cautioned that it is inadvisable to anchor in an area between an imaginary line drawn 176° from the mouth of Ab-e Mūrgh, and another imaginary line drawn parallel with the first line and one mile eastward of it, on account of the possible existence of telegraph cables.

Anchorage.—Tidal streams.—Vessels usually anchor south-eastward of the pier. There is also anchorage in depths of about 26 feet ($7^{m}9$), with the flagstaff of the British Consulate bearing 004°, distant about 3¾ miles. During fine weather, small craft anchor inshore. The holding ground is good and the anchorages are well sheltered, except from south-eastward.

The tidal streams at the anchorages set westward and eastward.

Chart 753.

Directions.—Vessels approaching Bandar 'Abbās or the anchorage off Qishm may pass on either side of Jazīreh Lārak.

When passing between Jazīreh Hormuz and Jazīreh Lārak, the latter may be approached to a distance of half a mile but the eastern end of Qishm island must be given a berth of at least 2 miles to clear the shoals off it, and Hormuz must not be closed within a distance of 2½ miles to avoid Euphrates patch (*Lat.* 27° 01′ *N., Long.* 56° 24′ *E.*).

If passing between Lārak and Qishm island, the shoal ground off the western side of the former must be avoided, and the eastern end of the latter should be given a berth of at least 2 miles to clear the shoals off the town of Qishm. The coast southward of the town of Qishm can be approached to a distance of one mile until nearing the off-lying patches, but the depths shoal quickly to the reef fringing the coast. It is advisable to keep on the Lārak side of the channel as the currents are irregular near the shoals off the eastern end of Qishm island.

Chart 3599, plan of Bandar Abbas.

Trade.—Supplies.—The principal exports are cotton, carpets, dried fruits, dates, almonds and pistachio nuts; the chief imports are cotton piece goods, sugar, tea, matches and woollen goods.

Calves, goats and chickens can be obtained in small numbers; fish, eggs, and fruit are plentiful. A small quantity of water can be obtained for boiler purposes.

Climate and health.—The climate of Bandar 'Abbās is not unhealthy, and from October to April, inclusive, is extremely pleasant. In winter, when the mountains northward are covered with snow, the air is dry, clear, and bracing. In summer, however, these rocky masses reflect heat on to the plain below, and the climate is damp, hot, and relaxing, but it is not such as to render it by any means insupportable to a European who is comfortably lodged, and the land and sea breezes, which are then fairly regular, do much to mitigate the heat. The prevailing diseases are malarial fever and diseases of

Charts 2837, 2858, 748b.

Chart 3599, plan of Bandar Abbas.

the skin; other diseases seldom exist in epidemic form. Sanitation of even the most elementary description is unknown.

Chart 753.

QISHM ISLAND.—Aspect.—Qishm island, known to the Persians as Jazīreh-e Qeshm, is the largest island in the Persian gulf; it lies nearly parallel with the coast of Persia, from which it is separated by Clarence strait. *See* page 114.

It rises in light-coloured table-topped hills with precipitous broken-down sides in many places remarkable in appearance. (*See* view facing this page). On the island are a few towns and numerous villages ; the inhabitants are for the most part poor and only trade in the barest necessaries of life. There is much game on the island; wild goats, partridges, and rock-pigeons abound in the hills, and on the plains are to be found many small antelopes or gazelles.

From May to October, inclusive, the climate is exceedingly trying.

Westward of the hills behind the town of Qishm, a low plain extends across the island for several miles, and farther westward are some table-topped hills which decrease in height towards Ras Khārgū, situated about 25 miles south-westward of the town, and are precipitous on their seaward sides. A white cone or sugar-loaf, 446 feet ($135^{m}9$) high, situated about 2 miles northward of Sūzeh, a small village with a date grove on the south-eastern coast, about 15 miles south-westward of Qishm, rises between a long plateau and a remarkable white hill, 509 feet ($155^{m}1$) high, with a small cone at its southern end; all show up well from seaward.

Behind the coastal hills are Finger peak, 941 feet ($280^{m}8$) high, and Jabal Biscoe, 994 feet ($303^{m}0$) high, situated about 6½ and 8¼ miles, respectively, westward of the white cone. Jabal Biscoe (*Lat. 26° 49′ N., Long. 55° 54′ E.*), has a peaked summit, which shows up well from southward.

South-eastern side of Qishm island.—Dangers.—The shores of the bight south-westward of the hill behind Qishm are low and sandy but farther south-westward, as far as Ras Khārgū, the coast is a succession of rocky patches between which are small sandy beaches.

This coast is open to the shamāl which in this locality blows from between south-west and west-south-west.

About 2 miles north-eastward of Sūzeh is a flat rocky islet 59 feet ($18^{m}0$) high with vertical sides, lying about half a mile off a rocky point; within this islet is a small bay in which there are depths of about 1½ fathoms ($2^{m}7$) and in which native craft shelter during the shamāl; about one mile north-eastward of the islet are three others lying about 4 cables offshore with foul ground between them and the coast; they are smaller than the first mentioned, the middle and largest being 56 feet ($17^{m}1$) high, the northern one is a flat ledge of rock only one or 2 feet ($0^{m}3$ or $0^{m}6$) high.

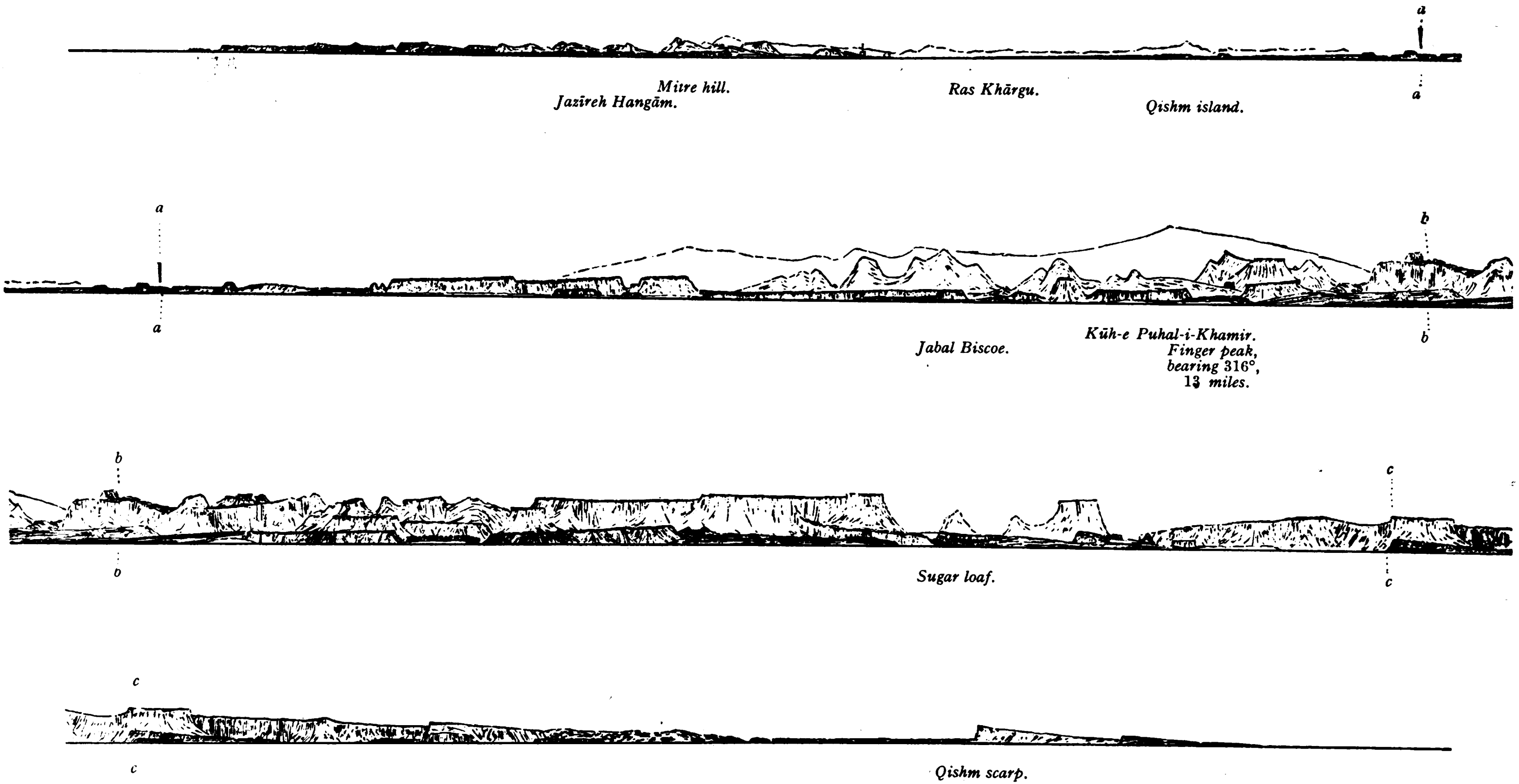
About half a mile eastward of Sūzeh, is a ruined tomb with a dome.

A shoal, on which, towards low water, the sea breaks in moderate weather, lies about 9 cables south-south-westward of the ruined tomb eastward of Sūzeh, but its position has not been accurately determined.

Masān (*Lat. 26° 44′ N., Long. 56° 00′ E.*) is a small village on the coast, with a date grove, situated about 4½ miles south-westward of

Charts 2837, 2858, 748b.

To face page 106.

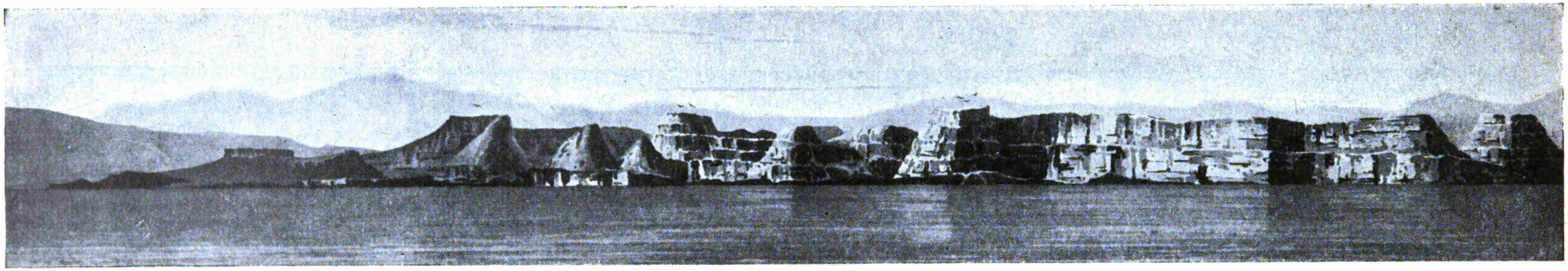


View, in four parts, of Qishm island from south-eastward.

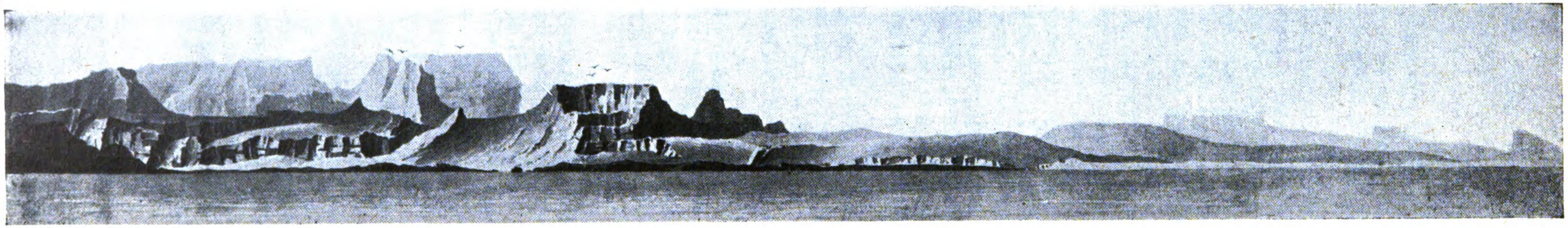
(*Original dated* 1931.)

Ras Dastakān, bearing 350°, 9 miles.
Qishm island.

South-western end of Qishm island.
(Original dated prior to 1915.)


Western hummock.
Centre hummock.
Highest hummock.

The Hummocks at south-western end of Qishm island from south-south-westward.
(Original dated 1822.)


Highest hummock.
Centre hummock.
Western hummock.

The Hummocks at south-western end of Qishm island from westward.
(Original dated 1822.)

Chart 753.

Sūzeh; inland of the village are some ruins and an old mosque. About one mile north-westward of the village is a remarkable isolated crag, 270 feet ($82^{m}3$) high, which shows up well from eastward.

Depths less than those shown on the chart were reported, in 1927, to exist about 2 miles southward of Masān.

Patrick Stewart bank is a detached patch, with a depth of 14 fathoms ($25^{m}6$) over it, lying about 8¼ miles south-south-eastward of Sūzeh, with greater depths close round it.

Tidal Streams.—For tidal streams in the middle of the Strait of Hormuz south-eastward of Jazīreh Hangām, *see* page 107.

Charts 3599, plan of Henjam sound, 753.

Jazīreh Hangām.—Jazīreh Hengām or Henjām lies off the middle of the south-eastern side of Qishm island with its north-eastern side about one mile south-westward of Ras Khārgū; its barren hills, which decrease in elevation from its northern to its comparatively low southern end, are covered with coarse grass and brushwood, and in colour the island is rather dark. (*See* view facing page 106).

Table hill, near the northern end of the island, rises to an elevation of 340 feet ($103^{m}6$); though remarkable on some bearings, it does not show up well when seen from southward against the higher land of Qishm island; on its summit is an inconspicuous whitewashed stone cairn, 7 feet ($2^{m}1$) in height. *See* view B on chart 753.

Jabal Mushi, about 3 cables northward of Table hill and separated from it by a low valley stretching from east to west across the northern end of Jazīreh Hangām, is 262 feet ($79^{m}9$) high and on its summit is a cairn, 10 feet ($3^{m}0$) in height.

Mitre hill, from which an irregular ridge extends about one mile south-eastward, rises to an elevation of about 350 feet ($106^{m}7$) about 7 cables south-eastward of Table hill. It has a double summit, the eastern being surmounted by a large and remarkable cairn. On the north-eastern side of the ridge is a rocky plateau, 130 feet ($39^{m}6$) high, sloping in steep cliffs to the valley.

The village of Ghail stands near some date groves on the western side, 3 miles south-westward of the northern extremity of the island, and a much larger village near the point at its southern end.

A Persian doctor is Quarantine officer at Hangām.

A small Persian garrison is maintained on the island. In 1942, it was reported that the population of Ghail and Hangām was each about 200, and of Ras Masheh about 50.

Chart 3599, plan of Henjam sound.

Hangām sound.—Dangers.—Beacon.—Hangām or Henjām sound is the name given to the strait between the north-eastern side of Jazīreh Hangām and Qishm island.

Ras Khārgū (*Lat. 26° 41′ N., Long. 55° 55′ E.*), on the north-eastern side of the sound, is low and rocky, rising gently to an elevation of about 100 feet ($30^{m}5$) where it terminates, about one mile inland, in a cliff which drops to a sandy plain from which latter rise several plateaux. At a short distance eastward of the point is a whitewashed cairn, 18 feet ($5^{m}5$) high. *See* view B on chart 753.

Rocky, uneven ground, with depths of less than 18 feet ($5^{m}5$) over it, extends about 4½ cables southward from Ras Khārgū.

Maundrell shoal, with a least depth of 3¼ fathoms ($5^{m}9$), lies about one mile south-eastward of Ras Khārgū; it is connected with the

Charts 2837, 2858, 748b.

Chart 3599, plan of Henjam sound.

shoal ground southward of the point by a ridge with depths of less than 6 fathoms (11^{m}0). A vessel should not pass between the shoal and the coast of Qishm island.

White point, on the south-western side of the sound, is situated about 1½ miles south-south-westward of Ras Khārgū; on it is a cairn 29 feet (8^{m}8) high. Between White point and Ras al Masheh, the low, sandy, northern extremity of Jazīreh Hangām, the coast is bordered by sandy beaches separated by rocky points. Ras Giohdna, three-quarters of a mile north-north-westward of White point, is marked by a cairn.

A beacon, consisting of concrete blocks surmounted by a staff and triangle, painted white and 25 feet (7^{m}6) in height, stands near the extremity of Ras al Masheh (*Lat. 26° 41′ N., Long. 55° 54′ E.*).

A radio mast, 205 feet (62^{m}5) in height, with four secondary masts near it, stands about 3½ cables southward of the beacon.

The coastal bank, with depths of less than 3 fathoms (5^{m}5), extends half a mile offshore between White point and Ras Giohdna, thence to Ras al Masheh the edge of the bank is about 2 cables offshore.

A shoal spit extends nearly one cable northward from Ras al Masheh.

A conspicuous stone hut stands on the coast about 4 cables north-westward of Ras Khārgū, and about 4 cables farther north-westward are the ruins of a similar hut.

For 1½ miles north-north-westward of Ras Khārgū the coast is rocky, thence it becomes low and sandy. Between Ras Khārgū and the conspicuous stone hut, depths of less than 3 fathoms (5^{m}5) lie within 3 cables of the coast.

Bevan patch, with a depth of 2¼ fathoms (4^{m}1), lies about half a mile off the northern shore about 1¼ miles north-westward of Ras Khārgū. From its north-western end a ridge, with depths of from 3¼ to 5½ fathoms (5^{m}9 to 10^{m}1), extends about 9 cables west-north-westward. A 5½-fathom (10^{m}1) patch lies close off the extremity of this ridge.

Mushi, a patch with a depth of 5¼ fathoms (9^{m}6), lies about one mile north-westward of Ras al Masheh. A patch, with a least depth of 5½ fathoms (10^{m}1), lies about three-quarters of a mile west-north-westward of the same point.

Ras Buser, 8½ cables south-westward of Ras al Masheh, is marked by a cairn, 10 feet (3^{m}0) in height, and a similar cairn stands on the north-western slope of Jabal Mushi.

A rocky bank, with depths less than 3 fathoms (5^{m}5) over it, fringes the coast of Jazīreh Hangām westward of Ras al Masheh; between that point and Ras Buser it extends about 2 cables offshore, but southward of Ras Buser its outer edge lies from 5 to 6 cables from the coast. The outer edge of this bank is steep-to.

In the eastern approach to the strait, the channel between the shoals on either side has a least depth of 5¼ fathoms (9^{m}6) over a width of 2½ cables, and a depth greater than 4 fathoms (7^{m}3) over a width of 4½ cables.

In the western approach the depths are from 5¼ to 6 fathoms (9^{m}6 to 11^{m}0).

Anchorages.—Directions.—There is an anchorage north-eastward of Ras al Masheh; it is sheltered, but is not a desirable one on account of the hard bottom and the strong tidal streams and eddies there.

Charts 753, 2837, 2858, 748b.

Chart 3599. plan of Henjam sound.

An anchorage, about 3 cables north-westward of Ras al Masheh (*Lat. 26° 21′ N., Long. 55° 54′ E.*), is partially sheltered from the shamāl which there blows from south-westward. The depths are irregular, over a bottom of sand and mud. The best berth is in a depth of from 7 to 9 fathoms ($12^{m}8$ to $16^{m}5$), with the beacon on Ras al Masheh bearing not less than 124°, distant about 3 cables.

A convenient berth is with the beacon on Ras al Masheh bearing 183°, distant 2¾ cables. It is reported that in the hot weather, any cool wind there may be is felt and it is not laden with sand or dust. The position is open to a strong shamāl and slight sea but the holding ground is good; it cannot, however, be recommended during the winter months.

A vessel with a draught of more than 20 feet ($6^{m}1$), entering Hangām sound from south-eastward, should exercise great caution and should keep well southward of Maundrell shoal. It is recommended to enter with the western edge of a conspicuous clump of trees close northward of the conspicuous stone hut, north-westward of Ras Khārgū, bearing 340°, but care must be taken to alter course westward in good time to avoid the foul ground southward of that point. During a shamāl it is better to approach the anchorage by the eastern, rather than the western entrance.

Caution.—Owing to the possible existence of telegraph cables, anchorage is inadvisable south-eastward of an imaginary line, joining a white stone hut, situated about half a mile south-eastward of Ras al Masheh, and the conspicuous stone hut north-westward of Ras Khārgū.

For the same reason, anchorage is inadvisable south-westward of an imaginary line, extending west-north-westward from Ras al Masheh to Mushi patch.

Tidal streams.—Eastward of Ras al Masheh, the tidal streams set north-westward and south-eastward; and at times attain a rate of nearly 2¼ knots, *see* table, page 288.

Port facilities.—Communications.—A pier, 300 feet ($91^{m}4$) long, with a depth of 2 feet ($0^{m}6$) alongside, and wooden steps near its head, extends north-eastward from a position close south-eastward of Ras al Masheh; at the root of the pier there is a large brick storehouse. Landing can also be effected on the western side of Ras al Masheh, where the beach is moderately steep.

Turtle can be obtained from the local fishermen. Beef, and a very limited quantity of mutton may be obtained, but 24 hours' notice must be given. Sea fishing and seining is good, and oysters can be taken from the rocks at low water.

Customs regulations are strictly enforced by the Persian authorities and duty is levied on every article landed.

Hangām is connected with the general telegraph system.

Charts 3599, plan of Henjām sound, 753.

Southern side of Qishm Island.—Danger.—Anchorage.—Bandar Dairistān is entered between Ras Khārgū (*Lat. 26° 41′ N., Long. 55° 55′ E.*) and Ras Sālakh (Salagh), about 9½ miles westward; the shore is low and sandy.

Chart 753.

Dairistān is a small village about 1¼ miles inland and 4 miles north-north-westward of Ras Khārgū.

Charts 2837, 2858, 748b.

Chart 753.

A wedge-shaped hill, about 2½ miles inland of the northern shore of Bandar Dairistān, is 344 feet (104^{m}8) high, long and prominent; between it and the hills northward of Dairistān is an extensive swampy plain, northward of which is Jabal Biscoe, *see* page 106.

Ras Sālakh is a sandy point, but it has a rocky beach; it may be approached to a distance of about half a mile; the hills lie about 2 miles northward of the point. About 2½ miles westward of Ras Sālakh is the village of Sālakh. Ras Tarkūn lies about 7½ miles west-south-westward of Ras Sālakh, the coast between being low and sandy, but within, the land rises gradually to cliffs which face northward and descend to a plain, beyond which the hills rise with broken and precipitous sides; about 2 miles northward of Sālakh they form a plateau, westward of which they become confused, and rise in varied and fantastic shapes.

A rock, with a depth of one foot (0^{m}3) over it, lies about 1¾ miles east-south-eastward of Ras Tarkūn near the edge of a bank which there fringes the coast.

A black chimney, 80 feet (24^{m}4) high, rises from the buildings of an oil company about 2½ cables eastward of Ras Tarkūn; it is conspicuous except from eastward when it is difficult to distinguish it from the dark hills behind it. There are two small, but conspicuous, trees about one mile north-eastward of the chimney.

Anchorage may be obtained off Ras Tarkūn, in a depth of 4 fathoms (7^{m}3), three-quarters of a mile offshore; it should be approached with the chimney bearing 013° in order to avoid the rock off that point. Landing is bad, for a ridge of sand, which nearly dries, runs parallel with, and about one cable off, the beach. The best place is reported to be a short distance westward of the path leading to the oil company's main building. There is a jetty, opposite the tall chimney, but it appears to dry about 6 feet (1^{m}8).

Chart 3791, plan of Basidu and its approaches.

Kish kūh, a hill with a small table-top, rises to an elevation of 1,331 feet (405^{m}7) about 4 miles west-north-westward of Ras Tarkūn. (*See* view B on chart 753). A range of dark red hills, largely composed of salt, with patches of slate colour, crosses the island from north to south about 3 miles westward of Kish kūh. There are extensive salt caves at the southern end of this range, from which brine exudes on to the plain between them and the sea and where, on evaporation, it leaves a large deposit of salt. About three-quarters of a mile north-westward of the point near the southern end of these hills, and about 7¾ miles west-south-westward of Ras Tarkūn, is a small stone hut which, though not conspicuous, has been found to be useful for fixing the position of the vessel when approaching the inshore passage round the western end of Qishm island; there are some fishing stakes close southward of the hut.

Kawuni (*Lat. 26° 35′ N., Long. 55° 25′ E.*). situated about one mile inland, is a small village near a few date trees about 3¼ miles westward of the salt caves, the intervening coast being hilly. About one mile north-north-westward of the village is a table-topped hill, 550 feet (167^{m}6) high; westward of the village, a plain extends, between the hills and the coast, as far as Ras Dastakān, a low rocky point about 7¼ miles west-south-westward of Kawuni. A prominent islet, about 10 feet (3^{m}0) high, lies close south-westward of Ras Kakūn, about 3¾ miles

Charts 2830, 2837, 2858, 748b.

Chart 3791, plan of Basidu and its approaches.

east-north-eastward of Ras Dastakān; between the islet and Ras Dastakān are two shallow bays separated by a point, close off the south-western extremity of which lies a flat rock, which dries about 5 feet ($1^{m}5$) and shows up well. About 6 cables north-westward of this rock is another rock, lying close offshore.

The Hummocks, nearly 3 miles north-north-eastward of Ras Dastakān, is the name given to three remarkable hills; the western is table-topped; the middle one has a rounded summit; and the eastern and highest is 577 feet ($175^{m}9$) high and table-topped; the southern sides of The Hummocks are precipitous and the eastern one is almost joined to a table-land the southern side of which is also precipitous; this table-land extends in an east-north-easterly and opposite direction for about 4 miles, ending eastward in a bluff. *See* views facing page 107.

Except in the vicinity of The Hummocks, where the land rises to some broken rocky hills, the western coast of Qishm island is low. (*See* view facing page 107). About 7¼ miles north-north-westward of Ras Dastakān is Ras Bāsīdū; between this point and a position about 5 miles southward of it, the coast is fringed by a flat of mud and sand, which extends as much as about 2 miles offshore. An overhanging cliff, resembling a shark's jaw, is situated about a mile north-north-westward of Ras Dastakān.

ISLANDS AND DANGERS SOUTH-WESTWARD OF QISHM ISLAND.—A bank, known as The Flat, which has depths of from 12 to 18 feet ($3^{m}7$ to $5^{m}5$) over it, lies off the south-western end of Qishm island, its outer edge lying about 9 miles off the southern coast of the island and about 5½ miles off the western coast. Discoloured water, at times almost brown, extends for some distance outside The Flat.

There is a narrow navigable channel between The Flat and the southern and western coasts of Qishm island. *See* page 123.

Mariner shoal, with a least depth of 24 feet ($7^{m}3$), lies about 12 miles south-south-westward of Ras Dastakān; as the depths are irregular, this locality should be avoided.

Chart 3452, plan of Jezirat Tunb.

Jazirat Tunb.—Light.—Dangers.—This island, 175 feet ($53^{m}3$) high, brown in colour, and level in outline, lies 15½ miles southward of Ras Dastakān; near its north-eastern extremity is a small peaked hummock, which is prominent from north-eastward and south-westward. *See* views facing page 112.

A light (*Lat. 26° 16′ N., Long. 55° 18′ E.*) is exhibited, at an elevation of 233 feet ($71^{m}0$), from a white, iron, framework structure, 71 feet ($21^{m}6$) in height, situated on the summit of Jazīrat Tunb.

Except at the northern and southern ends, where there are sandy beaches, the eastern side of the island consists of a low rocky cliff.

The south-eastern extremity of the island is fringed by a sandy bank, and the coast northward of it forms a bight, with depths of from 18 to 24 feet ($5^{m}5$ to $7^{m}3$) about 2 cables offshore.

A stony spit, with depths of from 3 to 6 feet ($0^{m}9$ to $1^{m}8$) over it, extends about half a mile west-south-westward from the south-eastern extremity of the island; northward of this spit there is a small bight with depths of from 9 to 12 feet ($2^{m}7$ to $3^{m}7$).

Charts 753, 2830, 2837, 2858, 748b.

Chart 3452, plan of Jezirat Tunb.

Foul ground extends a short distance from the south-western part of the island.

On the southern side of the island, a short distance inland, there is a hamlet, consisting of a few well-built houses, near which is a flagstaff.

The island is covered with coarse grass and shrubs, and on it are many small and very poisonous snakes; a considerable number of goats and some cattle are kept; fine oysters may be obtained.

Clive rock, one foot ($0^{m}3$) high, and steep-to, lies about 4 cables west-north-westward of the south-western extremity of Jazīrat Tunb. A rock, which dries 2 feet ($0^{m}6$), lies about 2 cables southward of Clive rock, and between them is a rock, with a depth of 5 feet ($1^{m}5$) over it. Ormonde rock, over which there is a depth of 7 feet ($2^{m}1$) and steep-to, lies about 4½ cables west-south-westward of Clive rock; and another rock, with a depth of 10 feet ($3^{m}0$), lies about 3 cables north-westward of Clive rock.

Off-lying dangers and banks.—Coote rock, with a depth over it of 27 feet ($8^{m}2$), lies about 5 miles eastward of the north-eastern extremity of Jazīrat Tunb.

A heavy tide-rip often occurs over a 19-fathom ($34^{m}7$) bank (chart 753), about 3 miles northward of the light structure on Jazirat Tunb; and also over a 12-fathom ($21^{m}9$) bank about 3½ miles west-north-westward of the light structure.

Two rocky patches, over which the depths are, respectively, 45 and 41 feet ($13^{m}7$ and $12^{m}3$), lie about 3 miles southward and 4 miles south-south-eastward of Jazīrat Tunb. The depths between these patches and the island are very irregular, and cause overfalls.

Anchorages.—The best anchorage at Jazīrat Tunb for a steam vessel is in a depth of from 7½ to 10 fathoms ($13^{m}7$ to $18^{m}3$) off the eastern side of the island. In this position the vessel is sheltered from the shamāl, though exposed to the nashi, but the tidal streams are not so strong as they are southward of the island. In 1931, H.M.S. *Penzance* anchored, in a depth of 4 fathoms ($7^{m}3$), rock, with a white hut on the south-eastern point of the island bearing 236°, distant 4½ cables.

Anchorage may be obtained off the southern side of the island, in a depth of 6 or 7 fathoms ($11^{m}0$ or $12^{m}8$), but the tidal streams run strongly eastward and westward.

During strong south-easterly winds, sheltered anchorage may be obtained north-westward of the island, in a depth of from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$), about 4½ cables offshore, with the light structure bearing 098°. When approaching this anchorage, due allowance must be made for the tidal stream.

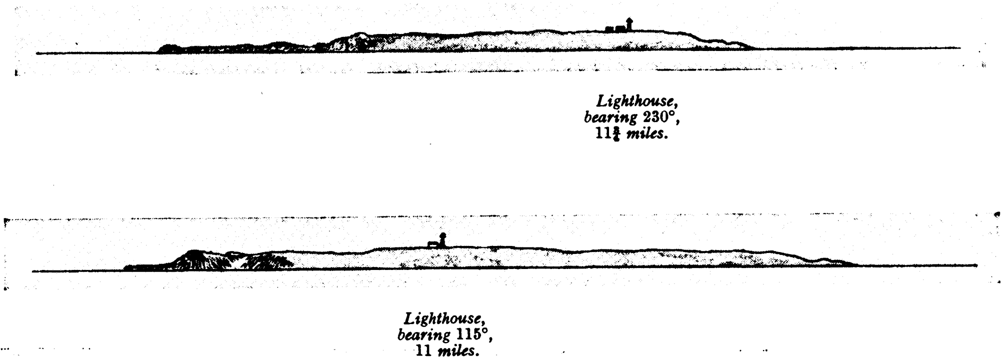
The best landing, except when the nashi is blowing, is on the beach in the bay northward of the south-eastern extremity of the island. Landing can also be effected without difficulty on the rocks off the village on the southern side of the island, or on a sandy beach on its north-western side.

Tidal streams.—For tidal streams in the vicinity of Jazīrat Tunb (*see* page 112); overfalls have been observed about 3 miles southward and 2½ miles north-westward of the island, those in the former position being the stronger.

The tidal streams over Coote rock (*Lat. 26° 17° N., Long. 55° 24′ E.*).

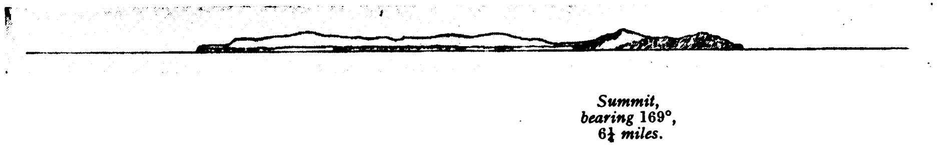
Charts 753, 2830, 2837, 2858, 748b.

To face page 112.



Two views of Jazīrat Tunb.

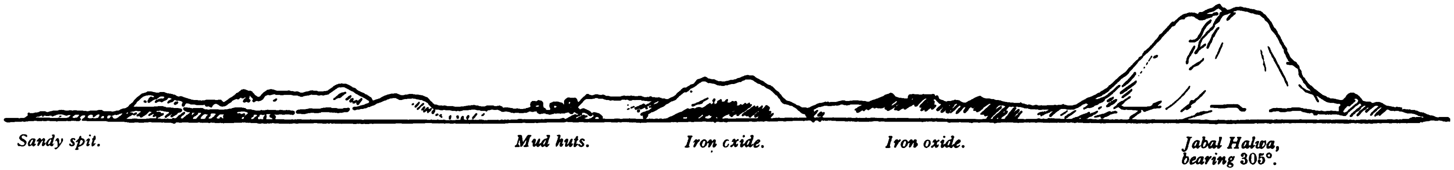
(*Originals dated* 1930.)



Jezīrat Nābiyu Tunb from north-north-westward.

(*Original dated* 1930.)

To face page 113.


Sandy spit.
Mud huts.
Iron oxide.
Iron oxide.
Jabal Halwa,
bearing 305°.

Jazīrat Bū Musā from south-eastward.

(*Original dated* 1928.)

Chart 3452, plan of Jazirat Tunb.

which attain a rate of from 2 to 3 knots at springs, cause strong tide-rips.

Charts 753, 2830.

Jazīrat Nābiyu Tunb.—This island, situated about 7 miles westward of Jazīrat Tunb, has a dark hill on its north-western point with two small peaks, 117 feet (35^{m}7) high; it is barren and uninhabited. *See* view facing page 112.

The island is steep-to except on its southern side, where a reef, which dries, extends about half a cable offshore, and on its western side where there is a rock 4 feet (1^{m}2) high.

In 1935, H.M.S. *Bideford* anchored in a depth of 4¾ fathoms (8^{m}7), sand, about a quarter of a mile from the eastern side of the island. Landing was effected on a sandy beach abreast this position.

In 1949, H.M.S. *Loch Quoich* anchored in 4½ fathoms (8^{m}2) about 2 cables off the south-eastern part of the island where a sandy beach provided easy landing.

Chart 3452, plan of Jezirat Bu Musa.

Jazīrat Bū Mūsa.—Dangers.—Anchorages.—This island, situated 25 miles south-south-westward of Jazīrat Tunb, is mostly low, but there are numerous hummocks, some of which, being of iron oxide, are dark chocolate in colour, and a ridge on the western side of the island attains an elevation of 234 feet (71^{m}3). Jabal Halwa, a prominent hill of light pinkish colour, rises abruptly in the northern part of the island to an elevation of 362 feet (110^{m}3). *See* view facing this page.

The northern point of the island rises to a remarkable hill with two summits, 153 feet (46^{m}6) high, and bright red in colour.

Two rocks, on which the sea breaks in moderate weather, lie near the outer edge of a bank, with a depth of less than 18 feet (5^{m}5), which extends about 4 cables from the northern part of the eastern side of the island. There is a depth of 9 feet (2^{m}7), about one cable outside the northern rock.

In the north-eastern part of the island, near a small date grove, are the ruins of a large house.

There are three bights on the southern side of the island separated by two rocky points. A flat, parts of which dry from 2 to 5 feet (0^{m}6 to 1^{m}5), extends about three-quarters of a mile from the shore of the eastern bight; and a flat, part of which dries 2 feet (0^{m}6), extends about 4 cables from the shore of the middle bight; there is a patch, which dries 2 feet (0^{m}6) and is steep-to, lying about 1½ cables outside this flat and 7 cables westward of the point separating the eastern and middle bights.

The point separating the middle and western bights terminates in a remarkable black rock, near which is a village with a flagstaff, which had a population of about 200 in 1949. Landing can be effected here. A sunken rock lies about 3½ cables north-westward of the extremity of this point, and a rocky shoal, with a depth of 12 feet (3^{m}7), lies about 4 cables westward of the point. In 1933, H.M.S. *Lupin* reported that there was a depth of 6 feet (1^{m}8) over this shoal (*Lat. 25° 52′ N., Long. 55° 01′ E.*).

The flagstaff, bearing 110°, and just open of a low dark-coloured mound westward of it, leads northward of the rocky shoal.

Charts 2830, 2837, 2858, 748b.

Chart 3452, plan of Jezirat Bu Musa.

A sunken rock lies about 3¾ cables westward of the western extremity of the island, and between them are three islets, the highest of which has an elevation of 50 feet (15ᵐ2) and is connected with the point at low water. This point is the termination of the range of hills on the western side of the island.

The north-western coast is rocky and should not be approached within one mile. At the south-western end of this coast, is a sandy bay about 2½ cables off which lie two islets with a rock, awash, between them.

Torlesse rock (*Lat. 25° 54′ N., Long. 55° 01′ E.*), over which there is a depth of 8 feet (2ᵐ4), lies about 1¼ miles westward of the northern extremity of the island; there are depths of 6 and 7 fathoms (11ᵐ0 and 12ᵐ8) close to the rock, on which latter the sea breaks heavily in rough weather.

There is a large quantity of iron oxide on the island.

Anchorage sheltered from the shamāl, may be obtained, in a depth of 7 fathoms (12ᵐ8), sand, near the southern end of the eastern coast of Jazīreh Bū Mūsa. In 1931, H.M.S. *Penzance* anchored, in a depth of 7 fathoms (12ᵐ8) mud, with some mud huts on the beach near the south-eastern extremity of the island bearing 280°, distant about 3½ cables.

In 1949, H.M.S. *Loch Quoich* anchored off the southern part of the island with Jabal Halwa bearing 352°, distant nearly 2½ miles; this anchorage provided excellent holding ground and no dragging was experienced during a shamāl of force from 7 to 8.

Good anchorage, sheltered from the kaus, may be obtained, in a depth of 6 fathoms (11ᵐ0), about 4 cables southward of the western extremity of the island. It has been reported, however, that several coral heads, with depths of less than 12 feet (3ᵐ7) over them, exist farther inshore, and this anchorage is not recommended on that account.

When the nashi has been blowing hard for a few days a strong southerly set is to be expected at this anchorage.

Tidal streams.—The tidal streams set south-westward and north-eastward at a rate of about one knot at springs.

Chart 753.

CLARENCE STRAIT.—This strait, which separates the island of Qishm from the coast of Persia, is contracted near its centre to a width of about 1¼ miles between Ras Puhal, on the mainland, about 31 miles south-westward of Bandar ʻAbbās, and a point on the island southward of it. South-westward of this point the channel is divided by a large island, that part of it north-westward of the island being known as Khōr Masakeh, and that part south-eastward of it being Khōr Gūrān.

From the junction of these two portions, at the south-western end of the island, to the south-western extremity of Qishm island the channel is known as Khōr Ja'farī (Jafuri).

Clarence strait is navigable by vessels of moderate size from its eastern entrance as far as Ras Lāft, situated about 2 miles south-south-westward of Ras Puhal, and vessels of shallower draught can proceed right through it; but the channel is not buoyed, the tidal streams are strong and, westward of Ras Lāft, the channels have not been thoroughly surveyed. The passage should not be attempted without local knowledge.

Charts 2830, 2837, 2858, 748b.

Charts 753.

The least depth in the fairway eastward of Ras Lāft (*Lat. 26° 56′ N., Long. 55° 44′ E.*) appears to be about 5¼ fathoms ($9^{m}6$) and that westward of it, 3½ fathoms ($6^{m}4$), which latter depth is found in the western entrance of the strait.

Pilots.—Pilots can be obtained at Qishm.

Charts 753, 2837.

Aspect.—On the mainland side of Clarence strait is the great chain of mountains that ends eastward in Kūh-e Ginau (page 100). A mountain, 5,120 feet ($1560^{m}6$) high, with two great steps or notches on its western side, lies about 18 miles west-south-westward of Kūh-e Ginau. Kuh-e Hormuz, about 36 miles west-north-westward of this latter, is a peak, 9,200 feet ($2804^{m}2$) high, which is visible over other mountains seaward of it; from southward its summit appears as three small peaks covered, in winter, with snow. Khūn Surkh range, between this lofty range and the sea, rises gradually from westward to an elevation of 1,645 feet ($501^{m}4$), and extends north-eastward from a position about 17 miles westward of Bandar ‘Abbās.

Chart 753.

Kūh-e Namak Sar range is a confused mass of irregular and precipitous peaks, the highest of which attains an elevation of 1,235 feet ($376^{m}4$), situated about 2 miles southward of the south-western end of Khūn Surkh range. Kūh-e Puhal-i-Khamīr (Khamīr peak), 3,725 feet ($1135^{m}4$) high, is a pointed summit, about 6½ miles north-westward of Ras Puhal, near the eastern end of a mountain range, which extends nearly 50 miles westward; West peak, in the same range and about 13 miles westward, is reported to be much higher, but is not prominent, and a spur of the range extends south-eastward from it. Between this range and the great range northward of it is a wide valley.

A third range begins northward of the south-western extremity of Qishm island and extends for a considerable distance westward (*see* page 124). There is a wide valley between this and the Kūh-e Puhal-i-Khamīr range through which flows the Rūd-e Mehran.

On the Qishm island side of Clarence strait, the most remarkable hills are situated in the neighbourhood of Bandar Biscoe, *see* page 106.

From Finger peak a range trends northward to within 1½ miles of the coast where it turns westward and, extending in that direction for about 6 miles, forms a coastal range of low irregular hills with no prominent summit, except Sugar-lqaf hill, 350 feet ($106^{m}7$) high, near its western end. Paipusht, a village on the slopes of the eastern hill of the coastal range, shows up well when the sun is shining on it.

Jabal Arab is a detached hill, 185 feet ($56^{m}4$) high, situated near the coast, about 1½ miles northward of Sugar-loaf hill, and about 2¾ miles south-eastward of Ras A‘la Mulk. Shaikh Musa is a detached hill, 270 feet ($82^{m}3$) high, situated about 1¼ miles southward of Ras A‘la Mulk; its southern side is perpendicular and forms a useful mark for vessels approaching from eastward. Jabal Meherhuni, 585 feet ($178^{m}3$) high, lies about 2½ miles southward of Ras A‘la Mulk and is also prominent from eastward.

Eastern end of Clarence strait.—Coasts.—Dangers.—On the southern side of the strait the land rises from a point to a table-topped hill, about 100 feet ($30^{m}5$) high, about 4 miles north-westward of the town of Qishm (page 103). About 6 miles westward of this hill is

Charts 2858, 748b.

Chart 753.

Jabal Horton, close northward of which is a low point. Between these two points there are several bights, filled by mud banks, which dry, extending about 2 miles offshore, with depths of less than 6 feet (1^{m}8) extending about a mile farther, where small craft may obtain anchorage when the nashi is blowing.

Khōr Taola, in which native boats are hauled up, runs in behind a long low point, at the south-eastern end of the mud bank, which extends westward from the point from which the 100-foot (30^{m}5) hill rises. Two islets named Dukuhak (*Lat. 27° 00′ N., Long. 56° 12′ E.*), 80 and 100 feet (24^{m}4 and 30^{m}5) high, respectively, lie on the mudbank off the entrance of Khōr Taola. Ras Milne, a bold promontory 225 feet (68^{m}6) high, projects on to the mud bank about 1¾ miles westward of Dukuhak. Jabal Salsul, a peaked precipitous hill, rises about three-quarters of a mile south-south-eastward of Ras Milne. Jabal Horton is a remarkable wedge-shaped hill, the bluff being on its southern side; it is 454 feet (138^{m}4) high and on its summit is a small tree.

About 6 miles westward of Sūru (page 105) on the northern side of the strait is Birkeh Band-i-ʻAli, a remarkable dome-shaped reservoir. A spit named Sūru, consisting of a bank of hard sand which dries, extends about 1½ miles offshore between them, and on its outer edge is Jazīreh Sūru, 8 feet (2^{m}4) high. About 1½ miles southward of the spit is the eastern end of another spit, with depths of from 4¼ to 4¾ fathoms (7^{m}8 to 8^{m}7), which extends from the shore westward with less depths.

Between Birkeh Band-e Ali and Ras Bustāneh, about 12 miles south-westward, a bank of dead coral, covered with sand and mud, dries for about 7 cables offshore, and as far southward as the village of Bustāneh, situated about 8 miles south-westward of Birkeh Band-i-ʻAli, is fairly steep-to; but in the bight between that village and Ras Bustāneh, a flat, with depths of less than 3 fathoms (5^{m}5) over it, extends about one mile outside the bank.

Ras Bustāneh is low and not easily identified though, on its eastern extremity, there is a hillock about 20 feet (6^{m}1) high.

Bustāneh East and West banks form practically one continuous bank lying parallel with, and about 2½ miles off the northern shore, its north-eastern end lying about 6 miles eastward of the village of Bustāneh. A patch on the East bank is sometimes awash, and one on the West bank dries 4 feet (1^{m}2). The banks are moderately steep-to on their southern sides. The channel north-westward of the banks, between them and the shoal bank extending from the mainland, is about 1¾ miles wide at its north-eastern end and three-quarters of a mile wide at its south-western end, with depths of from 4¼ to 8 fathoms (7^{m}8 to 14^{m}6).

Between the point close northward of Jabal Horton and Ras Kuwāi, 6½ miles west-south-westward, the southern shore is indented by several bights filled by mud flats, which dry. Dargawān is a small village with a few date trees near it, situated about 1½ miles south-westward of Jabal Horton.

A small detached bank of sand and rock, over which there is a least depth of 1½ fathoms (2^{m}7), lies from 6 to 8 cables offshore northward of Dargawān.

The village of Kuwāi, in which there is a date grove, stands about

Charts 2837a, 2858, 748b.

Chart 753.

3½ miles west-south-westward of Dargawān; near the beach is a water-tank and a ruined mosque. Ras Kuwāi (*Lat. 26° 57′ N., Long. 56° 00′ E.*) is steep-to and well defined and on it is a hillock, 50 feet ($15^{m}2$) high; immediately inland of the point is a plateau named Kuwāi, 270 feet ($82^{m}3$) high.

A small detached shoal, over which there is a least depth of 4½ fathoms ($8^{m}2$), hard sand, lies about 2 miles north-eastward of Ras Kuwāi, and is the principal fishing ground in the strait.

Zainubi is a great table-land from 300 to 500 feet ($91^{m}4$ to $152^{m}4$) high, extending parallel with the coast for about 3 miles west-south-westward of a position about 1¾ miles south-eastward of the village of Kuwāi; it is highest at its eastern end and there is a gap near its western end. Ras Zainubi, about 1½ miles south-westward of Ras Kuwāi, is at the north-eastern end of a plateau 180 feet ($54^{m}9$) high. On the point is the small village of Murghara. The village of Zainubi stands in a thick date grove about one mile inland.

Bandar Biscoe is entered between Ras Zainubi and Ras A'la Mulk, about 10 miles westward. About 5 miles southward of the shore of the bay are Jabal Biscoe and Finger peak (*see* page 106), which form useful landmarks. A bank, which dries, fringes the shore of the bay and extends from a quarter to half a mile offshore.

Ras A'la Mulk lies at the eastern end of a rocky plateau which rises to an elevation of 110 feet ($33^{m}5$); the village of A'la Mulk, near which are a few trees, lies close southward of the plateau; in the village is a small fort.

Between Ras Bustāneh and Ras Puhal, about 11½ miles west-south-westward, the northern shore is low and the high water line is not easily defined as the sea overflows it at spring tides. It appears to be fronted by a flat which dries and is of considerable extent, southward of the middle of which a bank, with depths less than 3 fathoms ($5^{m}5$) over it, extends to within a short distance of Middle banks (*see* below). On Ras Puhal are some ruined water-tanks and about 2½ cables north-eastward of the point is a remarkable tree. The mouth of the Rūd-e Kul, the water of which is extremely salt, is situated about 2 miles north-eastward of Ras Puhal; the river is navigable by native craft only. The village of Puhal, about 2 miles northward of the point, consists of a number of scattered groups of houses extending eastward and westward across the plain.

Middle banks consist of two shoals, about 1½ miles apart, between which are depths of from 3 to 5 fathoms ($5^{m}5$ to $9^{m}1$). They extend from a position about 1½ miles northward of Ras Zainubi to a position about 2 miles eastward of Ras A'la Mulk. The eastern bank is composed of rock and sand, and has a depth over it, near its centre, of one foot ($0^{m}3$); the western bank dries over a considerable area and is steep-to on its south-western side. The channel southward of Middle banks is from half a mile to one mile wide with depths of from 4½ to 12 fathoms ($8^{m}2$ to $21^{m}9$). There is a channel northward of the banks, but it is intricate and should not be attempted; at its western end there is a 2¾-fathom ($5^{m}0$) patch in mid-channel. The east-going tidal stream is reported to set strongly towards these banks.

The bight in the southern shore between Ras Zainubi (*Lat. 26° 56′ N., Long. 55° 58′ E.*) and Ras A'la Mulk is bordered by a shoal bank that dries in places and extends as much as half a mile offshore. The

Charts 2837, 2858, 748b.

Chart 753.

western part of this shore bank is fringed with a rocky bank, which, with depths of less than 3 fathoms (5m5), extends as much as half a mile farther offshore. From the eastern end of this rocky bank, a spit extends about 3 miles east-north-eastwards, with a depth of 4½ fathoms (8m2) over its extremity. There are depths of from 7 to 11 fathoms (12m8 to 20m1) between this spit and the shore bank southward of it.

Fasht A'la Mulk, which dries from 3 to 4 feet (0m9 to 1m2), lies near the western end of the foregoing rocky bank; and about 2 cables northward of the western end of the reef there is a detached shoal, over which there is a depth of 2½ fathoms (4m6).

A'la, a shoal consisting of some rocky patches, with a least depth of 3¼ fathoms (5m9), lies from about three-quarters of a mile to 1½ miles north-westward of Ras A'la Mulk.

Puhal, a patch with a depth of 3¾ fathoms (6m9), rock, lies about 6½ cables east-south-eastward of Ras Puhal.

About 1½ miles westward of Ras A'la Mulk is Lāft Qadim, a small rocky point, eastward of which, near the beach, there is a water-tank, 2 cables southward of which is a small mosque; both are fairly good marks. About 1¼ miles south-westward of Lāft Qadīm is a rocky plateau, 62 feet (18m9) high, and about 6 cables farther in the same direction is Ras Lāft. Between Lāft Qadim and the rocky plateau are the villages of Kahura and Geshira.

Ked, a shoal with a depth of 2½ fathoms (4m6), rock and sand. lies about three-quarters of a mile north-north-eastward of Ras Lāft.

Close within Ras Lāft there is a small hill, which is a useful mark when approaching the anchorage off the point. There are depths of less than 2 fathoms (3m7) extending about 3 cables northward and 1½ cables westward of the point, southward of the point these depths will be found 4½ cables offshore. Between one and 5 cables west-north-westward of the point the depths are irregular, varying from 3½ to 5 fathoms (6m4 to 9m1), sand and rock.

Low point lies about 1½ miles west-south-westward of Ras Lāft; from it a spit extends about 1½ miles north-north-eastward; the inner part of the spit dries and there is a depth of 3½ fathoms (6m4) over its outer end.

Anchorage.—Directions.—There is anchorage in the eastern entrance of the strait, in a depth of 10 fathoms (18m3), good holding ground, with Ras Milne bearing 214°, distant 4½ miles; in this position the flood tidal stream sets west-north-westward, and the ebb east-south-eastward, both attaining a rate of from 2 to 3 knots at springs and changing direction about 2 hours after high and low water, respectively, at Bandar 'Abbās (*Lat. 27° 11′ N., Long. 56° 16′ E.*).

A well-sheltered anchorage, with good holding ground, in depths of from 4½ to 7 fathoms (8m2 to 12m8), may be obtained between the village of Bustāneh and Bustāneh East bank; but in the eastern approach to it there are depths of from 3½ to 4½ fathoms (6m4 to 8m2).

A completely sheltered anchorage may be obtained by a vessel with local knowledge off Ras Puhal, in a depth of 5 fathoms (9m1) close offshore, but the tidal streams there are reported to attain a rate of 2½ knots, and the holding ground is bad.

A well protected anchorage may be obtained by a vessel with local knowledge 3½ cables north-westward of Ras Lāft, in a depth of

Charts 2837, 2858, 748b.

Chart 753.

6 fathoms (11^{m}0), or in 4 fathoms (7^{m}3) 2 cables from it. At this anchorage, the tidal streams attain a rate of 2 knots at springs, the stream running westward with the rising tide and north-eastward with the falling tide.

A vessel approaching Clarence strait from south-eastward, and having rounded the eastern end of Qishm island at a distance of not less than 2 miles (*see* page 105), should take care to avoid the shoal extending northward from Ras Milne (*Lat. 27° 00′ N., Long. 56° 10′ E.*). She should then steer to pass about 3½ cables northward of Ras Kuwāi, and thence steer for Jabal Arab, bearing 255°, which leads through the fairway southward of Middle banks; but care must be taken to avoid being set on to those banks by the east-going tidal stream. When Sugar-loaf hill opens out from behind a 320-foot (95^{m}7) bluff between it and the coast, bearing about 210°, the vessel should steer for the remarkable tree north-eastward of Ras Puhal, bearing 297°; but caution must be exercised, for this leads very close north-eastward of the detached 2½-fathom (4^{m}6) shoal northward of the western end of Fasht A'la Mulk and if followed too far will lead on to the patch named Puhal. Having passed northward of the shoal named A'la and southward of the patch named Puhal, the anchorage off Ras Lāft may be approached between the shoal named Ked and the spit extending from Low point. Strong eddies and overfalls may be expected off these shoals at spring tides.

Khōr Masakeh.—This branch of the channel through Clarence strait (*see* page 114), though wider than Khōr Gūrān, is seldom used by the pilots, for the banks on either side are in most places steep-to and, being covered, do not show in the muddy water. It was reported in 1912 that this channel had silted up and could then only be used by small craft with local knowledge.

About 3½ miles westward of Ras Puhal is the eastern extremity of a low island lying about half a mile off the northern shore; it is steep-to on its southern side, but there is no channel northward of it.

The town of Khamīr, about 8½ miles west-south-westward of Ras Puhal, is built round a fort with a high square tower; the town stands about half a mile inland, with a date grove eastward of it. There are two pyramidal hills, 150 feet (45^{m}7) high, about 2 or 3 miles west-south-westward of the town. There is a backwater about half a mile west-south-westward of the town the entrance to which is a narrow channel, with a least depth of 4 fathoms (7^{m}3).

Anchorage has been obtained, in a depth of 3½ fathoms (6^{m}4), about half a mile offshore south-eastward of the town of Khamīr.

The north-western shore of Khōr Masakeh south-westward of the entrance to the backwater at Khamīr is low swampy land covered with mangroves probably the delta of Rūd-e Mehrān.

The south-eastern side of Khōr Masakeh is formed by the north-western side of the large low island, covered with scrub, which, dividing Clarence strait into two channels, extends about 13 miles south-westward from Low point.

Khōr Gūrān.—Anchorages.—The navigable channel in this part of Clarence strait is only about one cable wide with depths of over 5 fathoms (9^{m}1) at its entrance, about 4 cables north-westward of Ras Lāft; but there are depths greater than 3½ fathoms (6^{m}4) over a width of 3 cables. Southward of Low point it is not less than 3 cables

Charts 2837, 2858, 748b.

Chart 753.

wide, except at the sharp turn from north-westward to south-westward in its southern part, where it is 2 cables wide. Although tortuous it is usually preferred by the pilots, as the depths in the fairway are not less than 5 fathoms ($9^{m}1$) throughout, and, except at the western entrance, the banks are well defined by mangroves. Khōr Gūrān joins Khōr Ja'afarī about 2 miles west-south-westward of the small village of Gūrān, situated on Qishm island, about 14 miles south-south-westward of Ras Lāft (*Lat. 26° 56′ N., Long. 55° 44′ E.*). The southern end of the channel is the most difficult part as it is very narrow, and several large bāgalas are sometimes moored off the village; the banks cover at high water, and are not marked by mangroves. The southern entrance is most easily navigated when the tide has fallen sufficiently to show the edges of the flats. Fishing stakes, hardly visible at high water, block the greater part of the channel south-westward of Gūrān.

In 1924, H.M.S. *Triad* reported that, from abreast of Jazīreh Hinderābi, lying about one mile southward of Ras Lāft, to abreast of Kuwardin (Kuvadin), situated about 5¼ miles south-south-eastward of that point, the banks on the western side of the channel had extended eastward in places for about half a mile and that the channel had correspondingly shifted eastward. Great caution is necessary when opposite the narrow channel leading north-westward about 2½ miles northward of Gūrān, as there the main channel has silted up, to a depth of about 9 feet ($2^{m}7$), from the southern shore for about three-quarters of its width, leaving only a narrow channel with a least depth of 4 fathoms ($7^{m}3$). Westward of Gūrān, the channel is very narrow and not straight as shown on chart 753; but the passage presented no difficulty at low water as the banks were uncovered and a single line of fishing stakes on the southern side showed the extent of that bank, which was steep-to.

Lāft, about 3 miles south-eastward of Ras Lāft, is a small town at the foot of a hill, 200 feet ($6^{m}10$) high, rising from the beach to cliffs; at the southern end of the town is a ruined fort with three towers.

Khōr Lāft, in which native craft lie, is entered at the southern end of Jazīreh Hinderābi and runs south-eastward close to the coast of Qishm island as far as the town. Jazīreh Hinderābi is low and at its northern end is a small white tomb. The creek is narrow and its south-western side consists of mud banks covered with mangrove bushes. There is a remarkable hill, from 500 to 600 feet ($152^{m}4$ to $182^{m}9$) high, about one mile east-north-eastward of Lāft, on the summit of which are reported to be the ruins of some reservoirs.

Anchorage was obtained by H.M.S. *Triad*, in a depth of 8 fathoms ($14^{m}6$), sand, about 3 cables south-westward of Jazīreh Hinderābi. Anchorage was also obtained by the same vessel, in a depth of 7 fathoms ($12^{m}8$), mud, close westward of Gūrān.

Chart 3791, plan of Basidu and its approaches.

Khōr Ja'farī—Directions.—Khōr Ja'farī (Jafuri), the western-most portion of Clarence strait, extends from the junction of Khōr Masakeh and Khōr Gūrān, about 16 miles south-westward to Ras Bāsīdū.

The mainland on the northern side of the channel is low for the first 7 or 8 miles, being formed by the delta of the Rūd-e Mehran.

Charts 2830, 2837, 2858, 748b.

Chart 3791, plan of Basidu and its approaches.

About 4¾ miles north-north-westward of Ras Bāsīdū is a low rounded point, on which are the ruins of many reservoirs.

On the southern shore, a white tomb is situated about 12 miles eastward of Ras Bāsīdū (*Lat. 26° 39′ N., Long. 55° 16′ E.*). The village of Dīrāku, 7¼ miles eastward of Ras Bāsīdū, stands on rising ground, and about 2 miles south-westward of Dīrāku is a large village, with extensive date groves and much cultivation; these two villages can be seen from the strait. Qal'eh Hājī Karī (Kalat Hajji Karitu), situated on the coast about 3 miles westward of Gūri, is a ruined fort standing on a small rocky mound with Nakhlistān, or Old Bāsīdū, about half a mile south-westward of it. Between Gūri and Qal'eh Hājī Karī the coast is low and barren, but here and there are large date plantations with a few houses.

Charts 3791, plan of Basidu and its approaches, 753.

A mud flat, which dries in most places, fringes the coast of Qishm island from Gūrān to Ras Bāsīdū and extends offshore from 2 cables to one mile in places.

A middle ground, over which the depths are less than 18 feet ($5^{m}5$), lies offshore between Dīrāku and Bāsīdū; in March, 1919, H.M.S. *Bramble* reported that changes appeared to have taken place and that the middle ground did not extend so far eastward and westward as charted, but lay farther southward. The navigable channel is northward of the middle ground and is about one mile wide.

The northern side of the navigable channel is bounded for the whole of its length by an extensive sand bank; H.M.S. *Bramble* reported that, northward of the middle ground, this bank appeared to have extended at least half a mile farther southward than charted.

In order to keep in the fairway, from a point about 3 miles west-south-westward of Gūrān, a vessel should keep from about 1¾ miles to three-quarters of a mile off the southern shore of the strait until northward of Kunār Sīāh, situated about 1½ miles north-eastward of Dīrāku, where they should cross over and proceed along the southern edge of the extensive sand bank on the northern side of the channel, in a depth of about 5 fathoms ($9^{m}1$), until past the middle ground, whence a south-westerly course may be steered for the anchorage off Bāsīdū.

Chart 3791, plans of Basidu anchorage and Basidu and its approaches.

Bāsīdū.—Dangers.—Beacon.—Ras Bāsīdū, on which the village of Bāsīdū is situated, is a cliff, 20 feet ($6^{m}1$) high, on the level summit of which are a few small buildings and some date trees. The point is fringed for about 2 cables offshore by a bank with depths of less than 18 feet ($5^{m}5$). A rocky patch, which nearly dries and close outside which there is a depth of 16 feet ($4^{m}9$), extends three-quarters of a cable north-westward from a position close north-westward of the pier at Bāsīdū.

About 4 cables north-westward of Ras Bāsīdū is The Gut, about one cable wide, with depths of from 11 to 14 fathoms ($20^{m}1$ to $25^{m}6$), extending north-eastward and south-westward.

Beacon shoal, the north-eastern end of which is rocky, the remainder being of sand, extends south-south-westward from a position about 6 cables westward of Ras Bāsīdū. For about half a cable from its north-eastern end, the shoal dries, as it does also in places farther southward. From the southern end of the shoal, a shallow sandspit extends about 3¼ miles south-south-eastward between the northern

Charts 2830, 2837, 2858, 748b.

Chart 3791, plans of Basidu anchorage and Basidu and its approaches.

extremity of The Flat (page 111) and the mud and sand flat extending from the western end of Qishm island. There is a narrow channel between Beacon shoal and its spit on the one hand and the mud and sand flat on the other, but it is not navigable.

A beacon (*Lat. 26° 39′ N., Long. 55° 15′ E.*), consisting of a white mast, about 40 feet ($12^{m}2$) high, with five white battens giving the appearance of being surmounted by a white circular disc, stands on the north-eastern extremity of Beacon shoal and is conspicuous.

North bank, apparently a south-westerly extension of the sand bank on the northern side of Khōr Ja'farī, extends north-eastward from a position about 6 miles west-south-westward of Ras Bāsīdū, with depths of from 12 to 18 feet ($3^{m}7$ to $5^{m}5$).

The village of Bāsīdū stands on Ras Bāsīdū, but the buildings are all in a state of decay. In 1928, the most prominent object when approaching from southward or westward was a tall bushy tree situated in the village, about 4½ cables east-north-eastward of the point. About a quarter of a mile southward of the point is a conspicuous building. A small cairn stands on Ras Bāsīdū. A monument stands about half a mile, and a guard house about 4 cables, east-north-eastward of the point. About a mile eastward of the point there is a village.

A dilapidated stone pier, the head of which is awash, extends north-westward from a position about one cable north-eastward of Ras Bāsīdū point; there are some steps at the head on both sides of the pier.

Fresh beef, of poor quality, may be obtained if one day's notice is given; vegetables may be obtained in small quantities.

Anchorage.—Depths.—The approach to the anchorage off Bāsīdū, from south-westward, is between North bank, on the north-western side, and The Flat and Beacon shoal, on the south-eastern side; there is a depth of about 21 feet ($6^{m}4$) in the fairway westward of The Flat, deepening to from 36 to 54 feet ($11^{m}0$ to $16^{m}5$) westward of Beacon shoal.

The approach to the anchorage from south-eastward may be made between The Flat, on the southern and south-western sides, and Qishm island and Beacon shoal, on the northern and north-eastern sides.

The best anchorage off Bāsīdū sheltered by Beacon shoal from the shamāl, which in this locality blows from south-westward, is on the south-eastern side of The Gut about 3 cables north-westward of the pier, or farther north-eastward, in depths of from 7 to 5 fathoms ($12^{m}8$ to $9^{m}1$), clay and good holding ground; care should be taken to avoid anchoring in The Gut.

It is advisable to moor with the anchors laid north-eastward and south-westward, for, when the wind is strong and in opposition to the tidal stream, a vessel at single anchor rides very uneasily.

Tidal streams.—The tidal streams in the western part of Clarence strait and at the anchorage off Bāsīdū attain a rate of about 3 knots at springs. Between Ras Dastakān and Ras Kharyu, about 24 miles westward, the east-going stream sets north-westward, northward, and north-eastward, converging on the anchorage; the west-going stream sets south-westward and westward.

Northward of The Flat, the tidal streams have been found to set

Charts 753, 2830, 2837, 2858, 748b.

Chart 3791, plans of Basidu anchorage and Basidu and its approaches.

fairly along the channel between it and Qishm island, and appear to have no tendency to set on to the shoals.

Directions.—The anchorage off Bāsīdū is not recommended for vessels with a draught of more than 20 feet (6^{m}1), and those with a draught of more than 17 feet (5^{m}2) should not enter until the tide has risen above mean sea level.

A vessel approaching from eastward and intending to use the channel northward of The Flat, should steer for the eastern Hummock, bearing 274°, until the point 7¾ miles west-south-westward of Ras Tarkūn bears 000°, distant about 8 cables, when she should steer for the 10-foot (3^{m}0) islet, situated close south-westward of Ras Kakūn (*Lat. 26° 34′ N., Long. 55° 22′ E.*), bearing 264°, until the former point bears 073°, when she should keep it astern on that bearing until the islet is abeam; thence she should steer to pass about three-quarters of a mile southward of Ras Dastakān, and thence keep in the middle of the fairway between the eastern side of the north-western end of The Flat southward and westward, and the sandspit extending from the southern end of Beacon shoal, eastward. When the southern end of Beacon shoal is abeam, course may be altered north-eastward, and the beacon on the northern end of the shoal passed at a distance of about a quarter of a mile, and thence course may be altered for the anchorage off Bāsīdū.

In 1931, the least depth obtained on this route was 24 feet (7^{m}3). The stone hut, about three-quarters of a mile north-westward of the point situated about 7¾ miles west-south-westward of Ras Tarkūn, sometimes stands out clearly when approaching from eastward. The 550-foot (167^{m}6) hill, about 4½ miles west-north-westward of the former point, is a good mark, being the western extremity and the highest part of a range, and falling abruptly to a valley on its western side. Caution is, however, necessary as the coastline is incorrectly charted.

Charts 3791, plan of Basidu and its approaches, 753.

A vessel approaching from eastward and intending to pass outside The Flat, should avoid Coote rock (page 112) and pass about 2 miles northward of Jazīreh Tunb, proceeding thence as directed below for the approach from southward.

A vessel approaching from southward and having passed on either side of Jazīreh Nābiyu Tunb, should bring it to bear about 169°, astern, and Grubb's notch (*see* below), if visible, ahead, bearing 349°; this course will lead about 5 miles westward of the shoalest part of Mariner shoal, and of the western edge of The Flat. When the eastern Hummock bears 072°, she should steer for Kūh-e Puhal-i-Khamīr (page 115), if visible, bearing 044°, until the beacon off Bāsīdū is abeam. It has been reported, however, that in normal summer visibility it is doubtful if the foregoing marks could be seen in time to be of use. The least depth on this route is about 21 feet (6^{m}4). The edges of Mariner shoal (*Lat. 26° 22′ N., Long. 55° 13′ E.*) and The Flat are indicated by discoloured water; and near the edge of the latter a number of fishing boats may often be seen at anchor.

A vessel approaching from westward should pass about 3 miles southward of Ras Kharyu (page 126) and steer east-north-eastward until Kūh-e Puhal-i-Khamīr bears 044°, thence she should proceed as previously directed.

At night, a vessel should anchor off The Flat, in a depth of about 6 fathoms (11^{m}0), and await daylight before proceeding farther.

Charts 2837, 2858, 748b.

Charts 753, 2830.

COAST.—Aspect.—About 10 miles northward of Ras Bāsīdū is a rounded mountain, 2,940 feet (896^{m}1) high, at the eastern end of the range on the southern side of the Rūd-e Mehrān (*see* page 119). Grubb's notch, in the same range, and about 14 miles westward of the rounded mountain, is a saddle-shaped summit, 2,950 feet (899^{m}2) high. Jabal Lingeh is a prominent summit, 3,900 feet (1188^{m}7) high, about 12 miles west-north-westward of Grubb's notch ; between the peak and Jabal Bustāneh (page 126), about 19 miles south-south-westward, is an extensive plain, which, after rain, becomes swampy.

Charts 3791, plan of Basidu and its approaches, 753.

The coast in the vicinity of the low rounded point, about 4¾ miles north-north-westward of Ras Bāsīdū is low, but about 5 miles westward of the rounded point it rises to a hill with an elevation of 1,330 feet (405^{m}4), and a very irregular outline; the eastern part of this stretch of coast is of a light colour whereas the western part is dark and apparently of volcanic formation; westward of the hill there is a plain. On the south-western side of the plain, about 7 miles in that direction from the hill, the land again becomes hilly. The north-eastern part of these hills is a long, light-coloured ridge, which attains an elevation of 1,020 feet (310^{m}9), with a very jagged outline, which is fairly prominent from east-south-eastward; the remaining hills are dark and of volcanic origin; near the coast and about 1½ miles south-westward of the southern end of the ridge is a flat-topped hill, 620 feet (189^{m}0) high, which shows up well from eastward; Al Būza, (*Lat. 26° 38′ N., Long. 55° 01′ E.*), three-quarters of a mile eastward of the last-mentioned hill, and on the coast, is similar to it but smaller.

Qal'eh Lashtun, about 8 miles westward of Al Būza and 4 miles inland, is 600 feet (18^{m}9) high, with a sloping summit and precipitous sides. This hill, which is detached from, and visible over, other hills between it and the coast shows up from eastward and south-eastward and appears wedge-shaped. A wedge-shaped hill, 400 feet (121^{m}9) high, lies about 4 miles south-westward of Qal'eh Lashtun and is prominent from eastward.

Chart 3791, plan of Basidu and its approaches.

Coast.—Anchorages.—Bandar Hamairān is a bight in the coast lying between the point situated about 2 miles southward of the 1,330-foot (405^{m}4) hill, mentioned above, and Ras ash Shāvari, about 5 miles south-westward. A shoal, with a depth of 10 feet (3^{m}0), lies about 1¾ miles from the head of the bight, and depths of 24 feet (7^{m}3) lie between it and the coast, where native craft anchor. The village of Bandar Mu'allim stands in a date grove about one mile northward of Ras ash Shāvari.

Kung is a town situated about 7 miles south-westward of Ras ash Shāvari; it extends about half a mile along the sandy coast, and contains many well-built houses and several gilded mosques. At the south-western end of the town are the ruins of a factory, near which, on the beach, is a round fort.

Anchorage, sheltered except from the suhaili, may be obtained, in a depth of 30 feet (9^{m}1), mud, abreast Kung about 1¼ miles offshore.

Landing is bad at low water, as the sandy beach dries out in ridges for about 2½ cables, with depths of one or 2 feet (0^{m}3 or 0^{m}6) between the ridges.

The coast from the low rounded point about 4¾ miles north-north-

Charts 2837, 2858, 748b.

Charts 3791, plan of Basidu and its approaches.

westward of Ras Bāsīdū to a position about 2½ miles south-westward of Kung is fringed by a bank, with depths of less than 18 feet (5^{m}5), which extends as much as 1¾ miles offshore, but it has not been thoroughly surveyed. As the edge of this bank is very steep-to in places, caution must be exercised when approaching it.

Chart 3517, plan of Lingeh.

Lingeh.—This town, the seat of a Deputy Governor of the Gulf Ports, is situated about 3½ miles south-westward of Kung. In it are many well-built houses occupying a narrow strip of the foreshore, and a short distance inland of it are some date groves. For some years the state of the town has deteriorated and, in 1950, only about one tenth of the shops and buildings were in use. In the forenoon, the town usually shows up well from seaward. The Deputy Governor's house on the sea-front is conspicuous. At the south-western end of the town is a conspicuous yellow stone leaning minaret, 83 feet (25^{m}3) high; its upper part, of grey and green bricks with a dark green roof, shows up well against the light-coloured land behind it. In addition, there are two radio masts, about 110 feet (33^{m}5) in height, situated about half a mile inland near the northern end of the town. Outside the town are many birkehs or circular domed reservoirs. In 1949, the radio masts were visible from a distance of about 2 miles, but it was not possible to identify the reservoirs.

The Custom house (*Lat. 26° 33′ N., Long. 54° 53′ E.*) is on the sea-front, south-westward of the Deputy Governor's residence, and on either side of it are boat cambers which dry. Both are artificial small craft harbours, constructed of piled stones; in 1950, they were in a good state of repair but were usable only at, or near, high water as considerable silting had taken place. The north-eastern camber has a wharf frontage of about 120 feet (36^{m}6) with a depth alongside of 4 feet (1^{m}2) at high water, and is used by fairly large dhows. The south-western camber has a narrow entrance and is only suitable for very small craft. Easterly winds produce a sharp sea at the entrances to both cambers.

The exports are carpets, canvas, gum, pearls, and dried fish; the imports are iron, hardware, cloth, spices, sugar, timber, coffee, tea, etc.

Anchorage.—Tidal streams.—Anchorage may be obtained, in a depth of about 33 feet (10^{m}1), clay and good holding ground, about 8½ cables south-eastward of the Custom house. Small craft anchor about 3 cables farther in, in depths of about 26 feet (7^{m}9). The anchorage is sheltered except from the suhaili, which causes a heavy sea.

The best landing place is in the camber north-eastward of the Custom house. The facilities for working cargo are good, but there are no cranes.

Off Lingeh, the tidal streams set south-westward and north-eastward at a rate of from a quarter to three-quarters of a knot.

Port facilities.—Communications.—Beef of poor quality, mutton, and vegetables can be obtained. Duck, bustard, and grouse can be shot during the winter months, but it is necessary to travel some miles inland to get them.

Lingeh is connected with the general telegraph system.

For communications by air, *see* page 18.

Chart 3791, plan of Basidu and its approaches.

Coast.—Dangers.—Jisheh, about 2 miles south-westward of

Charts 3791, plan of Basidu and its approaches.

Lingeh, is a small village in which there are two towers and near which are some date trees.

Ras Kharyu, about one mile south-westward of Jisheh, is low and sandy; but has a rocky beach. A spit, over which there is a depth of 9 feet ($2^{m}7$), extends about 4½ cables south-eastward from the point and a rocky patch, over which there is a depth of 15 feet ($4^{m}6$), lies about 8 cables southward of the point. The spit and the rocky patch are both steep-to.

Bandar Shīās, entered between Ras Kharyu and Ras ash Shīās, about 3¼ miles south-westward, is fringed by a bank, with depths of less than 18 feet ($5^{m}5$), extending about half a mile offshore.

Charts 753, 2830.

The village of Shīās, about 2½ miles westward of Ras Kharyu and three-quarters of a mile inland, is obscured from seaward by a thick grove of date trees; a tomb near the village is conspicuous. Ras ash Shīās is very low and sandy. About 9 miles westward of it is Ras Bustāneh, the shore of the bay between being fringed by a bank, with depths of less than 18 feet ($5^{m}5$), which extends three-quarters of a mile off in places. The shore of this bay is low and sandy, but it is fronted by a rocky beach. About one mile westward of Ras ash Shīās are some white sand hills rising close to the beach to an elevation of about 30 feet ($9^{m}1$); westward of these the land rises in a gentle slope from the coast to the foothills of Jabal Bustāneh (*see* below), which are from 200 to 300 feet ($61^{m}0$ to $91^{m}4$) high. About 2½ miles westward of Ras ash Shīās, is a grove of date trees, close to the shore.

Jabal Bustāneh is a remarkable detached group of dark volcanic hills of very irregular outline; the highest part, which attains an elevation of 1,876 feet ($571^{m}8$) near the middle of the group, is a ridge near the southern end of which, and about 4¾ miles north-eastward of Ras Bustāneh, is a small peak resembling a tower, which attains an elevation of 1,750 feet ($533^{m}4$) and is prominent, especially from eastward or westward. The south-western part of the group, about 3 miles north-westward of Ras Bustāneh (*Lat. 26° 30′ N., Long. 54° 38′ E.*), has been mistaken for that point when the low land forming the latter has been invisible. (*See* view C on chart 753). Between Jabal Bustāneh and the hills north-westward of Lingeh, the land rises in a gentle slope from the coast to an elevation of about 300 feet ($91^{m}4$), thence falling in cliffs to the southern edge of the low plain between that mountain and Jabal Lingeh (page 124).

Bustāneh, a fishing village, about 2 miles north-eastward of Ras Bustāneh, is small; in it there is a round tower and on rising ground behind it is a birkeh. There is a date grove at the village and another between it and the point.

Ras Bustāneh is low, and brown in colour; about 3 cables westward of it are some date palms. A shoal, with depths of less than 3 fathoms ($5^{m}5$) over it, extends about half a mile offshore on the south-western side of the point.

Charts 3791, plan of Basidu and its approaches, 753.

Anchorages.—Bandar Shīās affords good anchorage, in depths of from 5 to 7 fathoms ($9^{m}1$ to $12^{m}8$); it is sheltered from the shamāl, and the nashi does not raise a heavy sea as Qishm island and The Flat afford a certain amount of protection.

Charts 2837, 2858, 748b.

Charts 753, 2830.

Anchorage may be obtained off the coast between Ras ash Shīās and Ras Bustāneh; it is open to the shamāl but is well sheltered from the nashi. Good landing can be effected, on the sandy beach near the grove of date trees, about 2½ miles westward of Ras ash Shīās (*Lat. 26° 30′ N., Long. 54° 47′ E.*).

Anchorage for boats may be obtained, in a depth of 4 fathoms ($7^{m}3$), close inshore nearly one mile south-westward of the village of Bustāneh. The anchorage is partly sheltered from the westerly winds, which blow here during a shamāl; larger vessels cannot get close enough in to obtain much shelter.

Tidal streams.—The tidal streams off Ras Kharyu and Ras ash Shīās attain a rate of about 1½ knots and cause a discoloration of the water. *See* also page 122.

Chart 2830.

Off-lying dangers.—A steep-to shoal, with a depth of 4 fathoms ($7^{m}3$), lies about 1¾ miles south-westward of Ras Bustāneh.

Kad Fārūr, with a depth of 2½ fathoms ($4^{m}6$), coral, rock, shell and sand, and steep-to, lies about 5½ miles south-westward of Ras Bustāneh. Between this shoal and the 4-fathom ($7^{m}3$) shoal north-eastward of it, the depths are irregular, and the tidal streams, which set strongly between Kad Fārūr and Ras Bustāneh, cause much discoloration of the water, as well as tide-rips and overfalls. The shoals abound with fish.

Islands southward of Ras Bustāneh.—Anchorages.—Jazīrat Sirri, about 34 miles southward of Ras Bustāneh, has several small detached dark-coloured hillocks, none of which is more than 50 feet ($15^{m}2$) high. Several rocks awash lie about half a mile off the north-western side of the island. The eastern side of the island, and the low sandy point forming its south-eastern extremity, are steep-to, but elsewhere foul ground extends about half a mile offshore.

The village of Sirri is situated on the southern coast of the island, about 1¼ miles from its south-eastern extremity. Near the village is a flagstaff and several large trees. On the northern part of the island, are several houses and small date groves. There are two large wells on the island. *See* view facing page 130.

Anchorage off the island is indifferent; the recommended berth is, in a depth of about 8 fathoms ($14^{m}6$), rock, about half a mile off the southern side of the island, in the position indicated on the chart; this position is partially sheltered, both from the shamāl and the nashi, but the holding ground is bad, as is the landing at the village.

Jazīreh Nābiyu Fārūr, about 24 miles south-south-westward of Ras Bustāneh, has a remarkable dark-coloured saddle hill, 120 feet ($36^{m}6$) high, on its eastern side. *See* view facing page 130. A rocky reef, partly above water, and sometimes marked by breakers, extends about one mile north-north-westward from the island. The southern and western sides of the island are fringed by a narrow reef.

A bank, over which there is a depth of 8 fathoms ($14^{m}6$), hard bottom, lies about 1¼ miles south-south-westward of the island; it has not been thoroughly examined and it is therefore possible that there may be less depths over it.

A bank, over which there is a depth of 10 fathoms ($18^{m}3$), lies about one mile westward of the island.

With the foregoing exceptions, the island is comparatively steep-to.

Charts 2837, 2858, 748b.

Chart 2830.

Jazīreh-e Fārūr, about 12½ miles south-south-westward of Ras Bustāneh, rises with dark-coloured volcanic hills to a table-topped, conical peak, 476 feet ($145^{m}1$) high and surmounted by a cairn. The island is steep-to, especially on the northern, eastern, and southern sides. Several detached rocks lie above and below water close off the western side.

From its height, dark colour, and the fact that it is steep-to, the island is sometimes made at night, in thick weather, or during the haze of a summer shamāl; when attempting this, caution is necessary, for the tidal streams set strongly past it, and soundings give no warning of its proximity. The summit of the island is obscured by other hills from eastward and south-eastward.

There are two villages, the larger of which is situated on the eastern side in the dry bed of a river, with cliffs 50 feet ($15^{m}2$) high on either hand, and in which there are a few date palms; the other village consists of a few stone and mud huts near the southern point of the island with, about half a mile eastward of it, and standing on higher ground, the Custom house, a square stone building with a flagstaff.

The coastline of the island is mainly rocky, backed by cliffs, with an occasional small sandy bay. The best landing places are at the villages where there are sandy beaches. The island abounds with gazelle, and fish are plentiful in the vicinity.

Anchorage was obtained by H.M.S. *Crocus*, in 1929, off the village on the eastern side of the island, in a depth of 27 fathoms ($49^{m}4$), sand and shells, about 2¾ cables offshore, with the village bearing about 240°. Anchorage has also been obtained, in a depth of 20 fathoms ($36^{m}6$), with the village bearing about 257°.

Anchorage has been obtained in a small bay, at the southern end of the island, in a depth of 17 fathoms ($31^{m}1$), sand and shells. In suitable weather, landing can be effected on the eastern part of a steeply shelving beach.

Anchorage may be obtained off the western side of the island, in a depth of 7 fathoms ($12^{m}8$), rock and sand, with the summit bearing 090°, distant 14 cables.

Directions.—A vessel may pass either northward or southward of any of the foregoing islands, and by day, unless very hazy, the passages present no difficulty. For a vessel proceeding up or down the gulf, the passage between Kad Fārūr (*Lat.* 26° 26′ *N.*, *Long.* 54° 33′ *E.*) and Jazīreh-e Fārūr is to be preferred. By keeping in depths greater than 25 fathoms ($45^{m}7$), vessels will pass well southward of Kad Fārūr, and Jazīreh-e Fārūr usually shows up well at night; but vessels must guard against a northerly set which is sometimes experienced between Jazīrat Tunb and Jazīreh-e Shaikh Shu'aib, *see* page 134.

Caution.—Caution is necessary when navigating between Jazīrat Sirri and Jazīrat Halūl (page 136). This area has not been thoroughly examined and uncharted shoals have been reported.

Coast.—Anchorages.—Bandar Mughū is entered between Ras Bustāneh and Ras Yaridi (Yurd), a low point, about 13½ miles north-westward; its shores are low and sandy, and near the former point the beach is rocky; at either end of the bay the land rises in a gentle slope to the bases respectively of Jabal Bustāneh and Kūh Namaki

Charts 2837, 2858, 748b.

Chart 2830.

(*see* below), between which, and about 2½ miles inland, is precipitous broken ground.

A bank, with depths of less than 3 fathoms ($5^{m}5$), extends from half a mile to 1¼ miles offshore, and a detached shoal, with a depth of 2¼ fathoms ($4^{m}1$), lies about 1¾ miles offshore, and about 4 miles south-eastward of Ras Yaridi.

Duwwān is a small village, in which there is a fort with two white towers, standing about 5½ miles north-north-westward of Ras Bustāneh; behind the village, and on either side of it, are date groves. Mughū, about 4 miles westward of Duwwān, is a somewhat larger village in which are several round towers; a large fort with three remarkable square towers stands immediately behind the village with a date grove inland and westward of it; low sandhills extend about 2 miles eastward of the village.

From Ras Yaridi, the land begins to rise to Kūh Namaki, about 4¼ miles north-north-eastward, which is a rugged group of dark-coloured volcanic hills, about 1,200 feet ($365^{m}8$) high, which has a jagged outline, but no definite summit; from westward, its northern bluff shows up well, and it is reported that its south-eastern edge appears as a peak from the same direction.

A bank, with depths of less than 3 fathoms ($5^{m}5$), extends nearly 2 miles south-westward from Ras Yaridi, and is steep-to at its outer edge; it is marked by discoloration of the water.

Bandar Mughū affords good shelter from the kaus on its eastern side, but it is a dangerous anchorage during a shamāl. It is open to the suhaili which probably raises a heavy sea, but the holding ground is good.

Anchorage may be obtained close off the village of Mughū, in a depth of four fathoms ($7^{m}3$), clay, nearly one mile offshore; unless close inshore, very little shelter is obtained from the shamāl, which in this bay, blows from westward. In a depth of about 4 fathoms ($7^{m}3$), the bank extending from Ras Yaridi breaks the sea, but some swell rolls in, causing a vessel at anchor to ride uneasily. The depths decrease regularly towards the anchorage.

Chart 3517, plan of Chārak.

About 3½ miles north-north-westward of Ras Yaridi lies the village of Hasīneh. A large fort stands on the coast in front of the village and behind it the land rises gradually to the base of Kūh Namaki (*Lat. 26° 40′ N., Long. 54° 26′ E.*).

Anchorage may be obtained off Hasīneh, but it is open to the shamāl.

The coast between Hasīneh and Chārak, about 7 miles north-westward, is low and sandy, and may be approached to a distance of about one mile.

Chārak.—The town of Chārak, in which are several towers, has a date grove behind it, and on a hillock, about 90 feet ($27^{m}4$) high and nearly half a mile inland, is a small fort in ruins, which is conspicuous. The Shaikh's house, which stands in the middle of the town, is conspicuous. There is a Custom house. Cattle, sheep and goats may be obtained.

A small creek, in which boats are hauled up, is entered about one mile eastward of the Shaikh's house; a village stands on its western bank.

Jabal Hamar rises to an elevation of 370 feet ($112^{m}8$) about 1¼

Charts 2837, 2858, 748b.

Chart 3517, plan of Chārak

miles westward of the Shaikh's house and from south-westward appears wedge-shaped; there is a conspicuous birkeh on its southern side.

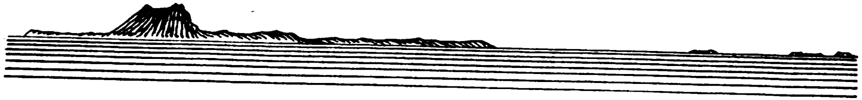
Coast.—There are two rocky points situated about 2 and 3 miles, respectively, westward of the Shaikh's house; foul ground extends about 4 cables offshore between the eastern point and Ras Tāvūneh, about 2¼ miles west-south-westward, and a rocky spit extends about 3½ cables from Ras Tāvūneh. On the latter point, which is about 30 feet ($9^{m}1$) high, is the village of Tāvūneh, and near it are a few date trees, four towers, and a castle, standing on a rocky hillock. *See* view facing page 130.

Anchorages.—Good anchorage, sheltered from the prevailing winds but open to the suhaili, may be obtained off Chārak, in a depth of 24 feet ($7^{m}3$), mud, with Ras Tāvūneh bearing 267°, and the ruined fort about 005°. The shamāl sends in some swell and vessels should, therefore, anchor closer in if their draught permits. The anchorage is well-sheltered from easterly winds. Landing at low water is bad, for the sandy beach in front of the town dries off in ridges for about 2 cables.

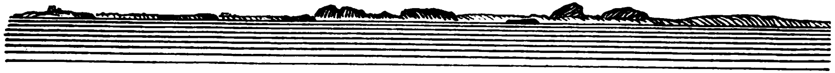
Anchorage may be obtained by small vessels about half a mile offshore at Tāvūneh, with Ras Tāvūneh (*Lat. 26° 42′ N., Long. 54° 12′ E.*) bearing about 295°, distant about three-quarters of a mile; in this position the vessel will be sheltered from the shamāl by the spit extending from the point.

Charts 2837, 2858, 748b.

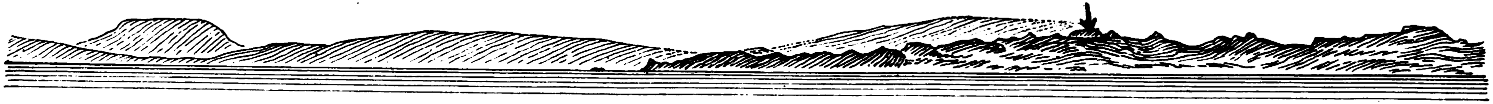
To face page 130.



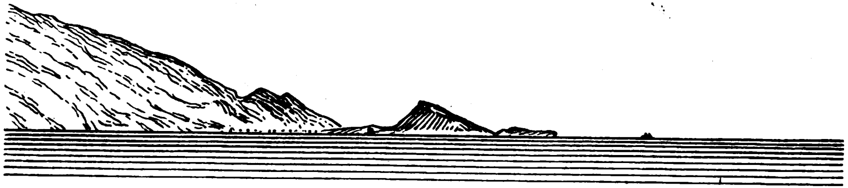
Jazīreh Nābiyu Fārūr from eastward.



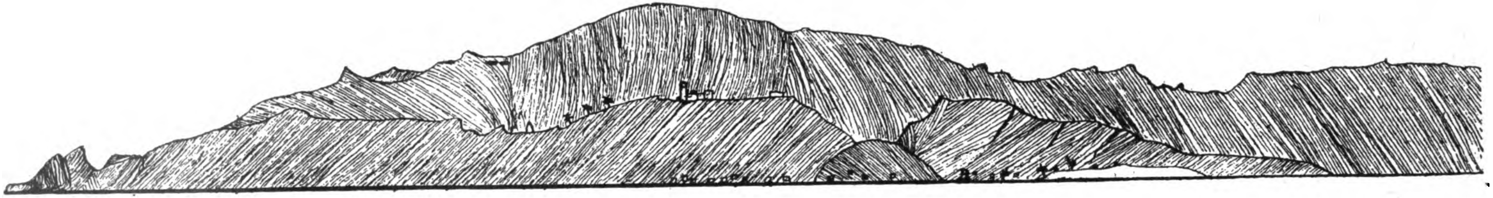
Jazīrat Sirri.
Bearing 235°, 6 *miles.*


Kūh-e Namki.
Summit.
Part of Jazīreh-e Fārūr.

Coast westward of Ras ash Shias


Ras Tāvūneh.
Jabal Hamar bearing 061°, 9 miles.
Chārak fort.

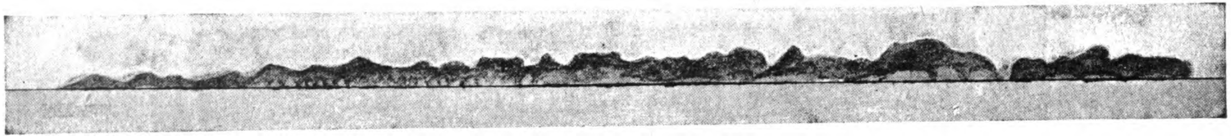
Approach to Chārak from westward.
(Originals dated prior to 1860.)



Conspicuous Tower,
bearing 342°,
about 1¼ *miles.*

Kalat al Abeid village from south-south-eastward.

(*Original dated* 1916.)



Western point,
bearing 355°
11 *miles.*

Jazīreh-e Shaikh Shu'aib.

Jazīreh-e Shitvār.

Jazīreh-e Shaikh Shu'aib and Jazīreh-e Shitvār from southward.

(*Original dated prior to* 1915.)

CHAPTER V

PERSIAN FULF, NORTH-EASTERN SIDE—COAST OF PERSIA—CHĀRAK TO RAS ASH SHATT, INCLUDING BUSHIRE.

Charts 2830, 2837, 2847.

COAST OF SHĪBKŪH.—Aspect.—The coast of this district of Persia extends from Chārak to Banak, about 140 miles north-westward.

The dominant feature of the whole of the mainland portion of the district is the great maritime range in the southern part of Persia, which rises steeply from the coast at its northern end and, trending south-eastward, gradually recedes inland and terminates in the rounded mountain about 10 miles northward of Ras Bāsīdū (*Lat. 26° 39′ N., Long. 55° 16′ E.*). *See* page 124. Northward of the plain behind Jabal Bustāneh there are several dark-coloured summits, one of which, situated about 17 miles north-north-westward of that mountain, is about 1,500 feet ($457^{m}2$) high, haycock-shaped, and prominent.

Chart 2830.

Kūh-e Namki or Jabal Turanjeh is of a flattened dome shape, light in colour, and has a small hummock on its summit; it rises to an elevation of 5,150 feet ($1569^{m}7$) about 14½ miles north-westward of Ras Bustāneh, and is a good mark from seaward from off Bāsīdū until on an easterly bearing, but within 10 miles of the coast is obscured by a lower range in front of it.

The lower or coastal range is from 2,000 to 3,000 feet ($609^{m}6$ to $914^{m}4$) high, and extends westward from a position close northward of Chārak (page 129), to Nakhīlū (page 137). About 8 miles west-north-westward of Chārak, there is a somewhat remarkable peak.

There are a number of coastal towns and villages on this coast. The population is a mixture of Persian and Arab blood.

Coast.—Between Ras Tāvūneh (page 130) and Gurzeh, 13½ miles westward, the coast is steep-to, and within it a plain extends to the foot of the coastal hills. Gurzeh is a small village in which there is a tower and near which is a date grove, situated on the northern shore of a bay, which is fairly steep-to. Anchorage, sheltered from the shamāl, may be obtained close of Gurzeh.

Kalat al Abeid is a fishing village about 4½ miles west-south-westward of Gurzeh. Between these two places the coast is fringed by a flat which extends about half a mile offshore. *See* view facing this page.

A conspicuous round tower, stands on a hill, 250 feet ($76^{m}2$) high, behind Kalat al Abeid, and eastward of the village are a number of date groves. There are two towers, one round and the other square, in the village, and below the fort, on a hillock about 150 feet ($45^{m}7$)

Charts 2858, 748b.

Chart 2830.

high, is a tomb; about one mile eastward of the village are several birkehs.

Anchorage may be obtained close offshore southward of Kalat al Abeid, in a depth of about 4 fathoms (7m3), sand, with the western extremity of the land bearing 260°. Caution is necessary as the depths in the vicinity may be less. The anchorage is sheltered from the shamāl and partially from the nashi; about three-quarters of a mile offshore there is but little shelter. Landing at the village is bad and often impracticable.

A flat, on which the sea breaks, extends about half a mile offshore between positions about 1¾ and 4½ miles westward of Kalat al Abeid, that part of the coast rising steeply to a small range of hills about 200 feet (61m0) high.

Chart 3517, plan of Chiru.

Chīrū.—Anchorage.—This fishing village, in which there is a square fort with a large square tower at each corner, and near which is a large date grove, is situated on the western side of a bay entered about 7½ miles westward of Kalat al Abeid. A prominent yellow tower, about 30 feet (9m1) in height, stands on the shore about 4 cables north-eastward of the fort.

Ras Chīrū (*Lat. 26° 42′ N., Long. 53° 44′ E.*), about three-quarters of a mile south-south-westward of the fort, is low and is steep-to on its southern and eastern sides.

A bank, with depths of less than 18 feet (5m5), extends about 3½ cables offshore north-eastward of the village.

Good anchorage may be obtained off Chīrū, in a depth of about 8 fathoms (14m6); it is easy of access, sheltered from the shamāl, but is open to easterly winds.

Landing may be effected, opposite the fort or the village, on a sandy beach which is steep-to, but during easterly winds it is bad.

Chart 2830.

Coast.—Between Ras Chīrū and Ras Nakhīlū, about 16 miles north-westward, the coast rises steeply to hills which decrease in height towards, and terminate near, the former point.

A bank, over which there are depths of less than 3 fathoms (5m5), sand, extends about one mile offshore for 3½ miles north-westward of Ras Chīrū; it is marked by discoloured water. Bandar Mansūri is an anchorage, used by native craft, on this bank from 2 to 3 miles westward of Ras Chīrū, but it affords indifferent shelter during easterly winds.

Jazeh, a table-topped hummock about 800 feet (243m8) high, lies about 8 miles north-westward of Ras Chīrū and 3½ miles inland; from southward it is a fairly good mark. All the hills in this locality are light in colour.

Makāhīl and Jazeh are small fishing villages on the coast about 13 and 14½ miles, respectively, north-westward of Ras Chīrū; there is a tower in each village and some trees near them. The anchorage off these villages is quite open and the coast is steep-to.

Ras Nakhīlū is low and ill-defined; close northward of it are some sand hills. A bank, with depths of less than 3 fathoms (5m5), extends about 8 cables south-westward from the point.

OFF-LYING ISLANDS.—Off the coast of Shībkūh, between Chārak and Ras Nakhīlū, are several islands and banks.

Charts 2837, 2858, 748b.

Chart 2830.

Jazīreh Qais.—Light.—Obstructions.—Light-vessel.—Jazīreh Qais, lying about 9 miles offshore southward of Gurzeh, rises to a plateau, about 120 feet (36^{m}6) high; being light brown in colour it is difficult to distinguish at night.

A light (*Lat. 26° 31′ N., Long. 53° 59′ E.*) is exhibited, at an elevation of 79 feet (24^{m}1), from a white, steel structure, 39 feet (11^{m}9) in height, situated on the southern side of Jazīreh Qais.

The coasts of the island are low and consist of sandy beaches between rocky points; but the eastern and western extremities are low cliffs. There are many trees on the island and several villages stand on its northern side.

Reefs, in most places steep-to, fringe the coasts of the island but nowhere do they extend for a greater distance than one mile offshore. A small detached bank, with a depth of 14 fathoms (25^{m}6) over it, was reported, in 1922, to lie about 2½ miles eastward of the eastern extremity of the island. Foul ground extends about half a mile off the southern and western coasts of the island, with depths of 6 and 8 fathoms (11^{m}0 and 14^{m}6) close outside it; beyond this the depths increase rapidly.

Obstructions were reported, in 1940, within an area, indicated by a dotted line on the chart, centred about 2¼ miles south-south-eastward of the light-structure on the southern side of Jazīreh Qais.

A light-vessel, painted red, with one mast, and " Kais island " in white letters on her sides, and exhibiting a light at an elevation of 32 feet (9^{m}8), is moored about 2 miles southward of the light-structure on the southern side of Jazīreh Qais. The charted position of this light-vessel is approximate.

Chart 3517, plan of Oais anchorage.

Safil, a small village, is situated about three-quarters of a mile west-south-westward of the northern extremity of Jazīreh Qais; this point is cliffy and about 15 feet (4^{m}6) high. At low water, landing at the village is bad, for a reef dries out about a quarter of a mile; the edge of the foul ground lies about 7 cables offshore northward of the village.

Dih, about 1¼ miles westward of North-east point, is a small village at which there are date groves. North-east point is low and sandy with a conspicuous fort with two towers on it. A sandy spit extends about 6 cables north-north-eastward from the point; there are depths of 21 feet (6^{m}4) over its outer part, and within 3 cables of the point there are depths of less than 18 feet (5^{m}5); the edge of the spit is steep-to.

The village of Māsheh extends about one mile along the shore of Bandar Māsheh southward of North-east point; a conspicuous tree stands about half a mile inland abreast the southern end of the village. East point, the southern entrance point of Bandar Māsheh, and the eastern extremity of the island, is a cliff about 6 feet (1^{m}8) high, with a conspicuous ruined tower on it, from which foul ground extends about 7 cables northward.

Anchorage.—Directions.—The best anchorage is off the northern part of the village of Māsheh, eastward of North-east point (*Lat. 26° 33′ N., Long. 54° 01′ E.*).

In summer, when shelter from the shamāl is often required, vessels should anchor, in depths of from 8 to 9 fathoms (14^{m}6 to 16^{m}5), mud, with the fort on North-east point bearing between 283° and 294°.

Charts 2837, 2858, 748b.

Chart 3517, plan of Qais anchorage.

In winter, anchorage may be obtained in the above position or northward of North-east point, in a depth of 10 fathoms ($18^{m}3$), with the fort on North-east point bearing 180°, distant about three-quarters of a mile. The latter position is partially sheltered from the shamāl, which in this locality blows from westward.

Anchorage may also be obtained in a depth of 8 fathoms ($14^{m}6$), about 1½ miles offshore on the northern side of the island, but it is exposed to the prevailing winds.

Chart 2830.

The tidal streams in the passage between Jazīreh Qais and the mainland are reported to be strong and very irregular; in the offing they are weak.

A vessel passing northward of Jazīreh Qais should not close the island to a distance of less than 2 miles unless proceeding to an anchorage. The passage northward of the island is not recommended at night unless the island can be seen.

A vessel passing southward of Jazīreh Qais should do so in a depth of not less than 20 fathoms ($36^{m}6$) and southward of the light-vessel.

Offlying Bank.—A steep-to bank, with a depth of 6 fathoms ($11^{m}0$), named Sambarun, lies about 7½ miles southward of Ras Chīrū (page 132).

Jazīreh Hindarābī.—Anchorage.—Caution.—This island, the eastern extremity of which lies 4½ miles west-south-westward of Ras Chīrū (*Lat. 26° 41′ N., Long. 53° 45′ E.*), rises gradually to an elevation of about 100 feet ($30^{m}5$); it is brown in colour and difficult to distinguish at night. The eastern and western points of the island are low cliffs, and about a quarter of a cable off the western point there is a flat detached rock, about 10 feet ($3^{m}0$) high. There is a village near the middle of the northern coast, near which are a few trees and some cultivation.

The island is fringed for its greater part by a reef, which on its northern side extends about a quarter of a mile offshore, making landing at the village bad at low water; off the north-eastern and eastern coasts, the reef is a little wider and is steep-to; on the southern side of the island it probably extends about one mile offshore, and is steep-to. A bank, with depths of less than 6 fathoms ($11^{m}0$), extends about a mile westward from the western end of the island.

Anchorage may be obtained off the village, in depths of from 6 to 8 fathoms ($11^{m}0$ to $14^{m}6$), rock; but it is open to the shamāl.

A current is reported sometimes to set towards Jazīreh Hindarābī and the coast in its vicinity; caution is therefore necessary at night.

The tidal stream is strong northward of the island, but weak in the offing.

Charts 3517, plan of Sheikh Shu'aib anchorage, 2830.

Jazīreh-e Shitvār.—Jazīreh-e Shitvār (Shatvār) lies about three quarters of a mile east-south-eastward of Jazīreh-e Shaikh Shu'aib and 4½ miles south-westward of Ras Nakhīlū (page 132). *See* view facing page 131. It is fringed with reefs extending about 1½ cables offshore, and a bank with depths of less than 6 fathoms ($11^{m}0$) over it, extends about one mile southward and the same distance eastward from it. There is a small detached bank with a depth of 9 fathoms ($16^{m}5$), about 3½ miles east-south-eastward of the island.

Jazīreh-e Shaikh Shu'aib.—Dangers.—This island, the eastern

Charts 2837, 2858, 748b.

Charts 3517, plan of Sheikh Shu'aib anchorage, 2830.

end of which lies about 6 miles west-south-westward of Ras Nakhīlū, is brown in colour and its eastern and western extremities are low but thence it rises to a number of hummocks having an elevation of about 120 feet (36^{m}6) (*see* view facing page 131); in 1950, a conspicuous tree was charted on the summit in the middle of the island. A conspicuous high square tower stands in the village of Laz (*see* below) near the eastern extremity of the island. In the middle of the island there is a valley in which are four small villages.

The low eastern extremity of the island consists of sand, but the south-eastern extremity, about 4 cables south-south-westward, is a cliff about 20 feet (6^{m}1) high.

A narrow spit, with a depth of 12 feet (3^{m}7), extends about half a mile from the eastern extremity of the island, thence the depths increase gradually eastward.

In the fairway of the channel between Jazīreh-e Shaikh Shu'aib and Jazīreh-e Shitvār there is a depth of 15 feet (4^{m}6); the best course through was reported in 1912 to be from a position about 3 cables off the south-eastern extremity of Jazīreh-e Shaikh Shu'aib to a position about 2½ cables north-westward of Jazīreh-e Shitvār, but caution is necessary as the channel has not been examined.

About 4¾ miles westward of the cliff, 20 feet (6^{m}1) high, mentioned above, there is a low sandy point, on which stands the village of Qurat (Kurat), with a tower and a large grove of trees. Between Qurat and the western extremity of the island, the coast consists mostly of rocky cliffs; the western extremity is also rocky, and is from 6 to 10 feet (1^{m}8 to 3^{m}0) high.

The southern coast of Jazīreh-e Shaikh Shu'aib is fringed by a reef which extends about one cable offshore. A bank, with depths of less than 6 fathoms (11^{m}0), extends about one mile westward from the western extremity of the island.

About 2 miles eastward of the western extremity of the northern side of the island, there is a small bight which affords good landing; thence to the eastern end of the island, the coast is bordered by cliffs with one or two sandy bights. A reef which extends from one to 2 cables offshore, fringes the northern coast.

Rās (*Lat. 26° 50′ N., Long. 53° 11′ E.*), a village at which there is a round tower and also a few trees, is situated about 1½ miles eastward of the western extremity of the island. Dekhūn and Laza are small villages, situated, respectively, about 6½ and 7 miles eastward of Rās; in the eastern of the two villages, there is a tower. Laz, the principal village in the island, stands on a small rocky point on the northern coast about one mile from its eastern end; southward of it are numerous large round trees and a few date palms.

Anchorages. — Directions. — Tidal streams. — During south-easterly winds, sheltered anchorage might be obtained off the eastern end of Jazīreh-e Shaikh Shu'aib, in depths of from 4 to 7 fathoms (7^{m}3 to 12^{m}8), sand and rock, about half a mile offshore north-eastward of Laz; but on the approach of a strong shamāl it would be necessary to put to sea, for in this region the wind then blows from west-north-westward.

Shelter from the shamāl can be obtained southward of the eastern end of Jazīreh-e Shaikh Shu'aib, in a depth of about 8 fathoms (14^{m}6), from 3 to 5 cables offshore between Qurat village and Jazīreh-e Shitvār, but the locality has been only partially examined.

Charts 2837, 2858, 748b.

Charts 3517, plan of Sheikh Shu'aib anchorage, 2830.

Anchorage, well sheltered from the shamāl, and to some extent from easterly winds also, may be obtained in the channel between Jazīreh-e Shaikh Shu'aib and Jazīreh-e Shitvār, in a depth of about 3 fathoms (5^m5), sand and rock, but the holding ground of decaying coral is very bad and the anchorage is not recommended; vessels using it should approach from southward and anchor rather nearer the western side of the channel, with the tower at Laz in line with the low eastern point of Jazīreh-e Shaikh Shu'aib.

Jazīreh-e Shaikh Shu'aib is exceedingly difficult to distinguish at night or in hazy weather, and sounding is of little use when approaching it.

When passing between Jazīreh-e Shaikh Shu'aib and the mainland, the coast in the vicinity of Ras Nakhīlū should not be approached into depths of less than 15 fathoms (27^m4). Caution is necessary as the tidal streams set across the channel and run strongly between Jazīreh-e Shaikh Shu'aib and Jazīreh-e Shitvār, causing a ripple on the spit extending from the eastern end of the former.

The tidal streams in the channel, between Jazīreh-e Shaikh Shu'aib and Jazīreh-e Shitvār, set north-north-eastward and south-south-westward ; between the islands and the mainland they are strong, but in the offing they are weak, with maximum rates of about one knot.

Between positions about 5 miles westward of Stiffe bank and 40 miles westward of a shoal named Shah Allum (*see* below), a southerly set of one knot was experienced duting a shamāl in March, 1940.

Chart 2830.

OUTLYING BANKS.—Light-vessels.—Shoal.—Buoy.—Stiffe bank (*Lat. 26° 26' N., Long. 53° 09' E.*), with a least depth of 15 fathoms (27^m4), sand, shells, and coral, lies about 27 miles south-westward of Jazīreh Hindarābi.

Stiffe bank was reported, in 1947, to lie one mile westward of its charted position.

A light-vessel painted red, with one mast and " Stiffe Bank " in white letters on her sides, and exhibiting a light, at an elevation of 30 feet (9^m1), is moored on Stiffe bank; this vessel displays a black cylinder at the masthead, above which is a red lantern. The charted position of this light-vessel is approximate.

A bank, which has not been examined and the position of which is approximate, was reported, in 1936, by the s.s. *British Judge*, in a position about 39 miles southward of the western end of Jazīreh-e Shaikh Shu'aib; the least depth obtained was 14 fathoms (25^m6) and the extent of the bank is at present unknown.

A shoal named Shah Allum, is a small dangerous rocky patch lying about 42 miles south-westward of the western extremity of Jazīreh-e Shaikh Shu'aib, and the least-known depth over it is 2 fathoms (3^m7). It is steep-to, and lies near the northern end of a bank over which the general depths are less than 20 fathoms (36^m6). No discoloration of the sea has been observed and the shoal cannot be seen from aloft; some white birds are, however, usually hovering over it.

In 1938, during a strong shamāl, the sea was observed to be breaking on Shah Allum and it was clearly defined at a distance of 1½ miles, and pale green discoloration extended southward.

Charts 2830, 2883.

Cable bank, with a least known depth of 14 fathoms (25^m6), lies

Charts 2830, 2883.

about 35 miles west-south-westward of the western extremity of Jazīreh-e Shaikh Shu'aib. Cable bank was reported, in 1947, to lie 1½ miles westward of its charted position.

A light-float painted red with a red framework tower and "Cable Bank" in white letters on its sides, and exhibiting a light at an elevation of 39 feet ($11^{m}9$), is moored on Cable bank. This light-float is fitted with a radar reflector.

Chart 2830.

COAST.—About 4 miles northward of Ras Nakhīlū (page 132) is the village of Nakhīlū, near which is a large grove of trees.

Anchorage, sheltered from easterly winds but open to the shamāl, may be obtained off Nahkīlū and the coast northward of it.

Chart 3517, plan of Mugam.

Mugām.—Anchorage.—About 3½ miles northward of Nakhīlū is the large village of Mugām, about a quarter of a mile northward of which is a large square fort. About 1½ miles north-westward of the fort, a conspicuous triangular cliff, about 165 feet ($50^{m}3$) high, stands about 4 cables inland. A bank, with depths of less than 18 feet ($5^{m}5$) over it, extends about 8 cables offshore abreast and north-westward of the village.

Anchorage may be obtained, in a depth of 6 fathoms ($11^{m}0$), mud, with the fort bearing 058°, distant about 13 cables, or close off the edge of the bank, in a depth of about 4 fathoms ($7^{m}3$), with the fort bearing 063°, distant about one mile.

Charts 2830, 2883.

Coast.—Between Mugām and Shīvūh, about 19 miles west-north-westward, there is a coastal range of hills, which rises steeply to a height of from 200 to 300 feet ($61^{m}0$ to $91^{m}4$), and over which can be seen the summits of another range, from 4,000 to 5,000 feet ($1219^{m}2$ to $1524^{m}0$) high, which runs parallel with it, and about 12 miles inland. North-eastward of Mugām, there is a fall or dip in the coastal hills which is a good mark. *See* view facing page 140.

Bandar Basatin, about 4½ miles west-north-westward of the fort at Mugām (*Lat. 26° 58′ N., Long. 53° 29′ E.*), is a small bay, the low point at the western end of which projects from rocky hills; near the point are some birkehs and from it a spit extends about half a mile offshore. The position of the bay may be identified by a low, jagged, light-coloured ridge of rock which, in line with a peak 4,870 feet ($1484^{m}4$) high (chart 2837), bearing 033°, leads to its western point.

Anchorage may be obtained about half a mile eastward of the point though it is little sheltered from the winds from westward and west-north-westward, that blow in the vicinity during a shamāl. Small vessels may anchor with the point bearing 270°; larger vessels should anchor as close inshore as their draught permits; there is a depth of about 10 fathoms ($18^{m}3$) about one mile offshore.

About 2½ miles eastward of Shīvūh there is a fairly prominent saddle-shaped hill about 400 feet ($121^{m}9$) high, and about 9 miles north-north-eastward is a mountain, known as the Paps, which is fairly prominent, especially from westward, and is a useful mark.

Chart 3599, plan of Shīvuh.

Shīvūh.—Light.—Anchorage.—This village is situated on the

Charts 2837, 2858, 748b.

Chart 3599, plan of Mugam.

eastern point of a small shallow indentation in the coast; in the village there is a large square white mosque, close eastward of which there is a fort; about half a mile east-south-eastward of the village, there is a peaked hill from 200 to 300 feet (61^{m}0 to 91^{m}4) high.

A light is exhibited occasionally from a flagstaff at the Custom house.

There is a small boat harbour, with a depth of 1½ feet (0^{m}5), formed by a flat, black, rocky ledge, at the south-eastern end of the village.

Gill rock, 4 feet (1^{m}2) high, lies 2¾ cables west-north-westward of the flagstaff of the Custom house.

Anchorage may be obtained, in a depth of about 5 fathoms (9^{m}1), sand, about a quarter of a mile off the black rocky ledge. In 1911, H.M.S. *Philomel* found this anchorage to be good even when the shamāl was blowing; although there was a swell which rendered landing impossible, it was much less than that experienced at other open anchorages. The tidal streams were weak and the vessel lay head to wind.

When practicable, the best landing place is in the boat harbour.

Chart 2830, 2883.

Coast.—About 2 miles westward of the Custom house at Shīvūh there is a rocky point from which the hills rise steeply. About one mile farther westward is Bandar Qalātu, which affords good shelter to small craft with local knowledge during a shamāl, and gives better protection to a vessel of moderate size than does the anchorage off Shīvūh. A vessel should anchor about 2½ cables from the point and as far inshore as the draught permits, off the village of Qalātu.

The coast, for about 5 miles westward of Qalātu, is indented and in most places cliffy; from the small sandy bays the hills rise steeply; there are a number of boat anchorages, close inshore, sheltered from the shamāl. Ziyārat and Buraghleh are small villages, in each of which are two birkehs, situated, respectively, about 1½ and 2½ miles west-north-westward of Qalātu.

Bustānu (*Lat. 27° 06′ N., Long. 53° 02′ E.*) is a village, situated at the head of a small bay, about one mile north-westward of Buraghleh. A ridge of grey-coloured rock, about 100 feet (30^{m}5) high, runs down to the coast close eastward of the village and on its southern end is a tower. Northward of the village there is a small creek navigable by dhows, but its entrance is difficult to identify.

Anchorage, probably the best in the vicinity, may be obtained off Bustānu, in a depth of 7 fathoms (12^{m}8), about 6 cables from the village; there are depths of 5 fathoms (9^{m}1) about 2½ cables offshore and 2 fathoms (3^{m}7) one cable from the beach.

The anchorage is well protected from the shamāl and, in February, 1924, H.M.S. *Crocus* rode out a strong kaus without dragging. A considerable surf runs inshore, but safe landing can be effected at the south-eastern end of the village by steering for the centre of the latter and when clear of the breakers steering south-eastward parallel with the coast; smooth water is obtained inside a reef which extends about 60 yards (54^{m}9) west-north-westward from the south-eastern end of the village.

Shāhīn kūh, about 2¾ miles north-westward of Bustānu, is a remarkable hill with precipitous sides; it is flat-topped and its southern bluff is about 1,100 feet (335^{m}3) high. *See* view facing page 140.

Charts 2837, 2858, 748b.

Charts 2830, 2883.

Kharābeh and Dastūr are two small settlements situated close together within 2 miles westward of Bustānu. ‘Amārīeh is a small fishing village on a hill about 5¾ miles north-westward of Dastūr. Tibin is a small village about 5½ miles north-westward of ‘Amārīeh; it is situated in a small bay and, except for one square hut, is scarcely noticeable from seaward. Close south-eastward of the village there is a remarkable brown slope, 380 feet ($115^{m}8$) high. It is reported that, in the vicinity, there is a bight in the coast, and about one mile northward of the village there is a small creek, open south-eastward, which affords shelter to dhows; it is not visible from seaward.

Chart 2883.

The coast between Tibin and Ras Nāband, about 15 miles north-westward, is bold, steep-to, and rocky with low cliffs; there are no anchorages or shelter. There are several villages on this stretch of coast.

Ras Nāband is faced with a white, rocky cliff about 10 feet ($3^{m}0$) high; south-eastward of the point the land rises gradually to the summits of white, precipitous, flat-topped cliffs, from 60 to 80 feet ($18^{m}3$ to $24^{m}4$) high. About half a mile inland of the point there is a large date grove, and about 3 miles south-eastward of it is a remarkable solitary tree standing on a high tableland. The western side of the point is steep-to, the depths increasing gradually to 30 fathoms ($54^{m}9$) about 3 miles offshore. The point is fringed by a bank, which, with depths of less than 3 fathoms ($5^{m}5$), extends about half a mile offshore.

The tidal streams in the vicinity and in Bandar Nāband are very weak.

Bandar Nāband.—Dangers.—Bandar Nāband is entered between Ras Nāband (*Lat. 27° 23′ N., Long. 52° 35′ E.*) and a low point situated about 5 miles north-north-eastward. The southern shore of the bay is fringed by a bank, which, with depths of less than 3 fathoms ($5^{m}5$) over it, extends as much as half a mile offshore; the head of the bay is shallow, depths of less than 3 fathoms ($5^{m}5$), mud, extending about 2 miles offshore.

A small rocky patch, over which there is a depth of 3 fathoms ($5^{m}5$), lies about 1½ miles south-westward of the northern entrance point of the bay; it is steep-to and does not show up well.

Gābandī valley extends about 35 miles east-south-eastward from the head of the bay, between the coastal hills and the mountain range behind them. On its northern side, the hills are of considerable height and fairly precipitous; about 15 miles east-south-eastward of the head of the bay there is a bluff, about 3,600 feet ($1097^{m}3$) high, which is prominent from west-north-westward.

The southern shore of the bay is low and rocky, and behind it the coastal hills rise to a moderate height; the shore at the head is low, sandy, and in places swampy.

Nāband or Hālat, a village with several remarkable trees on either side of it and a square fort at its western end, stands on the southern shore about 2½ miles within Ras Nāband, and between them is a point from which a reef extends about half a mile, affording shelter to boats from the shamāl.

A reef extends about a quarter of a mile from the northern entrance point of the bay. Eastward of it there is a sandy point from which

Charts 2837, 2858, 748b.

Charts 2883.

a reef extends about one cable, and for a distance of about 2 miles eastward of this point, the shore is low and swampy, and intersected by mangrove creeks.

Small craft with local knowledge may obtain anchorage at Bandar Baidheh Khān, eastward of the sandy point mentioned above. During a shamāl, these craft anchor in a depth of 2½ fathoms ($4^{m}6$) or less, but the shelter is indifferent.

The village of Baidheh Khān lies about one mile inland of the northern shore, about 2½ miles eastward of the northern entrance point, and is nearly hidden in a grove of trees.

Anchorages.—Directions.—Anchorage anywhere in Bandar Nāband is sheltered from the kaus, but, with the exception of the boat anchorage, is exposed to the shamāl, and when the latter is blowing a heavy sea rolls into the bay.

Anchorage may be obtained, in a depth of 6 fathoms ($11^{m}0$), with Nāband bearing between 135° and 180°, distant about one mile; the holding ground is, however, reported to be bad.

Anchorage, reported to be partly sheltered from the shamāl, may be obtained, in a depth of 3 fathoms ($5^{m}5$), with good holding ground, with a square house westward of Baidheh Khān bearing 019°, and a tower, situated about 2½ miles south-eastward of the village, bearing 086°.

Landing can be effected anywhere in the bay except in northerly or westerly winds, which raise a heavy surf.

The passage between the 3-fathom ($5^{m}5$) patch situated 1½ miles off the northern entrance point and the reef off that point is about one mile wide, but it should not be used; by far the better entrance, which is about 2 miles wide, is that between the patch and the reef off Nāband village.

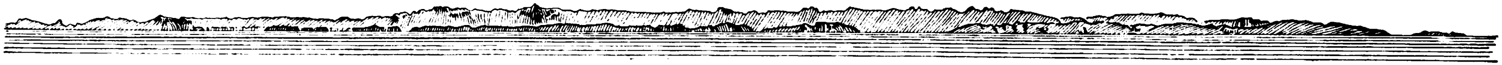
Coast.—Aspect.—Between the northern entrance point of Bandar Nāband and Banak, about 40 miles north-westward, there is a coastal range of mountains, the seaward side of which appears to be precipitous; at times the fires of the charcoal burners are visible high up in the mountains. Date groves extend from close north-westward of the northern entrance point of Bandar Nāband to beyond 'Asalū, about one mile from the point.

Jabal Sīr-i-Yalfal, about 6 miles northward of the northern entrance point of Bandar Nāband, is a summit in the coastal range, 4,870 feet ($1484^{m}4$) high, which appears as a great step, except from westward when it looks like a sharp notch. *See* views on chart 2847 and B on chart 2837.

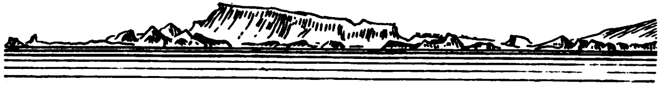
Kūh-e Kuchur is a mountain range which extends about 38 miles north-westward from a position about 6 miles north-north-westward from Jabal Sīr-i-Yalfal (*Lat. 27° 33'., Lon. 52° 37' E.*). About the middle of this range, 25 miles north-westward of Jabal Sīr-i-Yalfal and 5 miles inland, Jabal Sīri, a remarkable barn-shaped peak, rises to an elevation of 4,840 feet ($1475^{m}2$). This range terminates north-westward in a great step or fall. From westward Jabal Sīri appears small and from close inshore it is obscured from view by the coastal range (*see* above). About 38 miles north-westward of Jabal Sīri is a rounded mountain, 4,000 feet ($1219^{m}2$) high, on the sides of which are streaks of salt which glisten when the sun shines on them. *See* view A on chart 2847 and view facing this page.

Charts 2837, 2847, 2858, 748b.

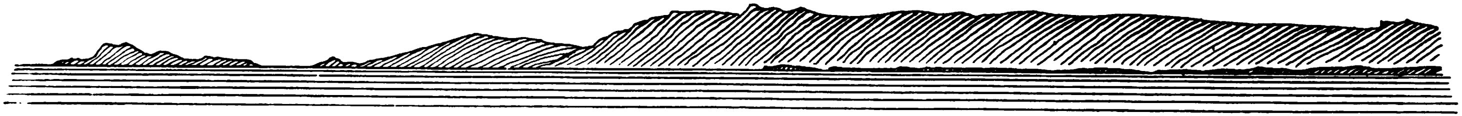
To face page 140.



Coast of Shībkūh.



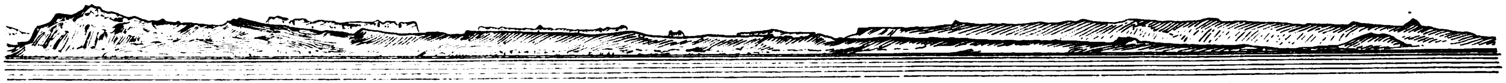
Shāhīn kūh, bearing 336°, 8 miles.


Jabal Sīri.
Jabal Sīr-i-Yalfal, distant about 50 miles.
Ras Naband.

Coast north-westward of Ras Naband.

(Original dated prior to 1860.)

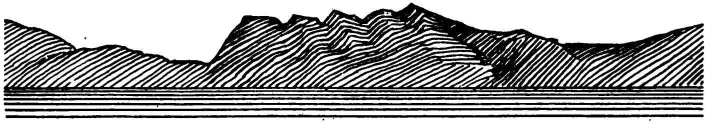
To face page 141.



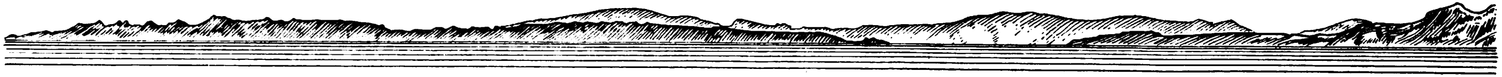
Kūh-e Dirang,
bearing 054°, 20 miles.

Jabal Sīri,
bearing 094°, 50 *miles.*

Coast of Dashtī.



Kūh-e Dirang,
bearing 071°, 20 *miles.*



Kūh Sehtanj
or
Asses Ears,
bearing 347°,
36 *miles.*

Kūh Khūrmūj.

Coast of Tangistan.

(*Original dated prior to* 1860.)

Chart 2883.

'Asalū.—Anchorage.—There is a large date grove behind 'Asalū village, and a remarkable, though partially destroyed, round tower stands on a hillock north-westward of it. In 1941, the population was about 400.

A reef extends over half a mile offshore for about 3½ miles north-westward of the northern entrance point of Bandar Nāband; there are depths of from 5 and 6 fathoms ($9^{m}1$ and $11^{m}0$) close outside the reef which should not be approached into a depth of less than 7 fathoms ($12^{m}8$). Boats pass over the reef and shelter close to the village in depths rather greater than those over the reef.

Anchorage off the village is open to the shamāl; the holding ground is poor, and it is necessary to approach with caution as the shore reef is very steep-to.

Coast.—Anchorages.—Nakhl Taqi, about 2 miles north-westward of 'Asalū, is a small village at which there is a fort and a tower; there are some date trees in the vicinity and two or three large round trees stand between the village and 'Asalū.

A reef, close outside which there are depths of 8 fathoms ($14^{m}6$), extends about a quarter of a mile offshore, and caution should be exercised when approaching it.

Barak, about 13 miles north-westward of Nakhl Taqi, is a small village with a fort, a square tower, and a date grove. The coast is between these villages rises steeply to the hills and is nearly steep-to, there being little or no coastal reef. About 2½ miles south-eastward of Barak there is another small village, in which there is a square tower. About 2 miles westward of Barak there is a low point which affords partial shelter from the shamāl to boats anchored off the village. A shoal, with depths of from 2 to 3½ fathoms ($3^{m}7$ to $6^{m}4$) over it, extends about one mile south-south-eastward from this point, and is steep-to.

The village of Tāhirī is situated on the shore of Bandar Tāhirī, about 3½ miles westward of Barak (*Lat. 27° 39′ N., Long. 52° 24′ E.*), and extends some distance up the side of the coastal hills which there rise from the head of the bay to an elevation of about 700 feet ($213^{m}4$). Two forts, neither of which is conspicuous, stand at the eastern end of the village and about half a mile eastward of them are three large, round, remarkable trees. On the foreshore, in the middle of the village, are two white mosques about 1½ cables apart, and on a small hill westward of the village there is a large fort with a square wind-tower, near which is a large, prominent round tower with a white band near its top and a flagstaff. The north-western entrance point of the bay, about one mile westward of the village, is low and almost steep-to; near it are some date groves. The depths in the bay shoal gradually from 8 fathoms ($14^{m}6$) about half a mile offshore.

Anchorage, partially sheltered from the shamāl but exposed to the kaus, may be obtained, in a depth of about 6 fathoms ($11^{m}0$), with good holding ground, close offshore with the western entrance point of the bay bearing about 284°.

The coast between Tāhirī and Banak, about 21 miles north-westward, is fairly steep-to and may be approached to a distance of about half a mile. Akhtar, about 6 miles westward of Tāhirī, is a small village almost hidden among date groves, but it has a large, round, prominent mosque in the middle of it. Anchorage, exposed to the

Charts 2837, 2847, 2858, 748b.

Chart 2883.

kaus, may be obtained, in a depth of 11 fathoms ($20^{m}1$), with good holding ground, about half a mile south-westward of the mosque.

Ras Akhtar and Ras Aswad are two slightly projecting points about 2 miles west-north-westward of Akhtar, between which there is a bight in which boats can anchor sheltered by the latter point. ‘Ayānāt, about 4 miles north-westward of Akhtar, is a village, with a few trees interspersed amongst the houses, and date groves at either end of it. A tower stands at the western end of the village. *See* view facing page 140.

Two reefs marked by breakers, lie one on each side of ‘Ayānāt and form a boat harbour; they extend parallel with the coast from a half to three-quarters of a mile offshore; the western reef is about 1½ miles in length and the eastern reef one mile. The channel between the reefs is about half a mile wide. The landing is good. Dhows anchor inside the reefs.

Anchorage, open but reported to be moderately good during a shamāl, may be obtained off ‘Ayānāt, in a depth of 10 fathoms ($18^{m}3$).

About 2¼ miles north-westward of ‘Ayānāt is situated the village of Miāntū, in which there is a fort standing on an elevation. About 5 miles farther north-westward is Ras al Marrar, a low point, from which rocks extend about half a cable. Kangān, about 2 miles north-westward of Ras al Marrar, is an important town standing on a sandy beach; there is a tower at its northern end, and a large date grove is situated about half a mile north-westward of it.

Anchorage may be obtained off Kangān, in a depth of 5 fathoms ($9^{m}1$) from a half to three-quarters of a mile offshore; the anchorage is partially sheltered from the shamāl, but some swell rolls in from west-south-westward; it is exposed to the kaus.

COAST OF DASHTĪ.—Aspect.—The coast of this district extends about 23 miles westward from a position close westward of Banak, situated about 3 miles north-westward of Kangān, and thence about 40 miles north-westward to Qalāt.

In the vicinity and north-westward of Kangān (*Lat. 27° 50′ N., Long. 52° 04′ E.*) is a coastal range, from 2,000 to 3,000 feet ($609^{m}6$ to $914^{m}4$) high, which appears at a distance to form part of the main range (*see* page 140) but which obscures the latter from view when close inshore; the mountains forming it are rugged, precipitous, and are very irregular in outline.

A valley extends north-westward from the coast westward of Banak and separates the foregoing mountain ranges from a detached group of mountains between them and the sea. Kūh-e Dirang is the summit of this group and rises to an elevation of 3,270 feet ($996^{m}8$), at its northern end, about 25 miles north-westward of Banak; according to the direction from which it is seen, the mountain appears either as one peak or surmounted by from three to five hummocks of equal height. From south-westward the hummocks are in line and a great bluff appears on the northern side of the mountain. *See* views A and B on chart 2847, and facing this page.

Funnel hill, towards which the mountains forming the group decrease in elevation, is situated on the south-western side of the group about 14 miles south-south-eastward of the central summit of Kūh-e Dirang and about 3 miles inland; it is table-topped, about 800 feet ($243^{m}8$)

Charts 2837, 2847, 2858, 748b.

Chart 2883.

high, and on it is a small natural pillar that is a good landmark. *See* view B on chart 2847.

Northward of this group of mountains lies an extensive low, swampy plain.

Coast.—Anchorage.—For about 7 miles westward of Banak the coast is low and sandy.

Bardistān, about 4 miles westward of Banak and about 2½ miles inland, is a town at which there is a tall bād-gīr, or wind-tower, which is partly hidden by trees. It stands near a creek, the mouth of which is situated about 2¾ miles southward. During rains the creek becomes the mouth of the water-course which drains the valley.

About 5 miles west-south-westward of Banak is Daiyir, a small town, in which there is a square fort with two towers, and some round trees; eastward of the village there is a large date grove. The Shaikh's house, a white two-storied building with a small flagstaff, stands near the fort. A remarkable isolated rock of light grey colour, and from 60 to 80 feet ($18^{m}3$ to $24^{m}4$) in height, stands about one mile westward of the town and about three quarters of a mile inland; it has the appearance of a square tower and can be identified from some distance.

Excellent anchorage, affording far better protection from the shamāl than that off Kangān, but exposed to the kaus, may be obtained off Daiyir, in a depth of 4 fathoms ($7^{m}3$), with the fort, bearing 000°, distant about half a mile; large vessels should anchor farther out, in depths of from 8 to 10 fathoms ($14^{m}6$ to $18^{m}3$), mud.

Landing is difficult unless the boat is able to cross a reef which extends from one to 2 cables offshore abreast Daiyir.

At springs, the tidal streams attain a rate of from one to 2 knots at the anchorage off Daiyir (*Lat. 27° 49′ N., Long. 51° 56′ E.*).

A small rocky point, consisting of low cliffs, projects from the coast about 2½ miles westward of Daiyir, and about one cable off it are some sunken rocks, within which there is a landing place. In the vicinity of the point, and for a distance of about 7 miles westward of it, the hills descend to the coast. Anchorage may be obtained, in a depth of 6 fathoms ($11^{m}0$), about half a mile off this point. About 9 miles westward of Daiyir is the village of Batūneh, off which there is anchorage, but it is exposed both to the shamāl and the kaus. About 9 miles westward of Batūneh is Ras Umm al Karam, and 27 miles north-westward of the latter is Kabgān at the mouth of Rūd-e Mūnd. Between Batūneh and Kabgān there are several date groves, but there are no villages. This stretch of coast is bordered by extensive swamps and fronted by shoals and cannot be approached.

Islets and dangers.—Jazīreh Umm al Karam, known to the natives as Qurma, is a low islet lying about one mile north-westward of Ras Umm al Karam. About 4½ miles north-westward of the same point is Umm Sīla, a low sandy islet, lying about one mile offshore.

Nakhīlū is a low islet lying about 5 miles westward of Jazīreh Umm al Karam; in the middle of the islet is the tomb of a shaikh, a square building of loose stones; a cairn, about 5 feet ($1^{m}5$) high, stands on the north-eastern extremity of the islet. From a position close off Nakhīlū, some date groves on the coast of the mainland are just visible.

Ras al Mutāf, about 10½ miles south-eastward of Nakhīlū, is the south-eastern extremity of a shoal situated on a shoal bank extending about 18 miles south-eastward from the islet,

Charts 2837, 2847, 2858, 748b.

Chart 2883.

which consists of sand over rock; the shoal is almost dry for many miles from its north-western end, but its eastern end is covered. In 1892, it was reported by H.M.S. *Sphinx* that the shoal probably extends farther westward and southward than charted. In 1912, H.M.S. *Espiegle* reported a 2-fathom ($3^{m}7$) patch southward of Ras al Mutāf in a position about 13½ miles south-south-eastward of Funnel hill (page 142), and, in 1939, a sand bank, almost awash, was reported to lie about 15½ miles south-westward of the same hill.

A bank, with a depth of 8 fathoms ($14^{m}6$), lies about 22 miles south-westward of Funnel hill.

Khōr Khān is a channel, with depths of from 12 to 42 feet ($3^{m}7$ to $14^{m}6$), inside the shoal bank on which Ras al Mutāf (*Lat. 27° 43′ N., Long. 51° 38′ E.*) lies. The principal entrance is northward of the eastern end of the shoal bank and has depths of from 15 to 36 feet ($4^{m}6$ to $11^{m}0$) in it. The channel continues north-westward for about 7 miles beyond Nakhīlū, but there is no outlet at its north-western end. The channel is used by small native craft which are able to leave it by a channel close northward of Nakhīlū, in which there are depths of 5 feet ($1^{m}5$). The cairn on Nakhīlū in line with the shaikh's tomb leads through Khōr Khān. Shoals extend from 2 to 3 miles from the mainland shore of Khōr Khān, but a channel, in which there is reported to be a depth of 10 fathoms ($18^{m}3$), leads westward through them and passes inside Jazīreh Umm al Karam.

Jazīreh Jābrīn, known to the natives as Tahmādu and lies with Ras Tahmādu, its south-eastern extremity, about 1½ miles north-westward of Nakhīlū; it is a low narrow strip of sand with tufts of grass on it; it is uninhabited, but is frequented by flamingoes, pelicans, and curlew. Between Ras Tahmādu and Nakhīlū is the boat channel into Khōr Khān. Eastward of Jazīreh Jābrīn there is an extensive swamp intersected by deep creeks, the mainland being distant about 5 miles; this swamp continues northward almost to Kabgān.

Anchorages.—Directions.—Tidal streams.—Anchorage may be obtained, by vessels with local knowledge, in depths of 4 or 5 fathoms ($7^{m}3$ or $9^{m}1$), off the eastern end of the shoal of which Ras al Mutāf is the south-eastern extremity, with Funnel hill bearing 330° and Jabal Sīri, 073°. This anchorage is sheltered from the shamāl but exposed to the kaus. As there is no good shelter from the shamāl between this anchorage and Bushire, more than 90 miles northward, it is resorted to by vessels caught by a north-westerly gale off that part of the coast.

When rounding the shoal vessels should not approach within depths of less than 11 or 12 fathoms ($20^{m}1$ or $21^{m}9$); and at night, or in thick weather, it should not be approached within depths of less than 15 fathoms ($27^{m}4$). By day, the discoloration, which extends some miles off the shoal into considerable depths, is a good guide.

As the coast from Nakhīlū almost to Kabgān is extremely low, caution is necessary when in its vicinity, especially at night, or in thick weather, a vessel should not approach within depths of less than 14 fathoms ($25^{m}6$).

The tidal streams are reported to set westward and eastward over the shoal; and south-westward of it they appear to set north-westward and south-eastward. A perceptible indraught into the bay eastward of Ras al Mutāf has been observed on several occasions, during the

Charts 2837, 2847, 2858, 748b.

Chart 2883.

south-east-going tidal stream. At springs these streams attain a rate of about 2 knots; both in the channels inside the shoals and along their outer edge they are reported to be strong.

Coast.—Anchorages.—Buoy.—Ras Jābrīn, close northward of the northern end of Jazīreh Jābrīn, with which it is almost connected, is the south-western extremity of the swamps which extend from the mainland and join those northward of the island.

Ras al Khān (*Lat. 28° 00′ N., Long. 51° 20′ E.*), about 12½ miles north-north-westward of Nakhīlū, is the southern end of a very low sandy ridge which is almost covered at high water. The ridge and the coast northward of it, almost as far as Kabgān, project considerably from the coast farther northward and form the seaward edge of the swamps which probably constitute the delta of Rūd-e Mūnd and are part of the great valley between the coastal hills northward of Kabgān and the mountains extending in that direction from Kūh-e Dirang.

Anchorage, affording indifferent shelter from the shamāl, may be obtained by small craft with local knowledge in a small bay, south-eastward of Ras al Khān, in depths of from 2 to 2½ fathoms ($3^{m}7$ to $4^{m}6$).

Khōr Ziārat is a small creek with low banks about 12 miles northward of Ras al Khān; it can be entered by boats at high water, but the entrance, from which Kūh-e Dirang bears 098°, is open north-westward; there are depths of about 4 feet ($1^{m}2$) on the bar, and 9 feet ($2^{m}7$) in the channel for about 2 miles within it. The creek is a mouth of Rūd-e Mund, which after rains discharges a large volume of water.

Open anchorage may be obtained about 1½ miles off the entrance of Khōr Ziārat, in a depth of 4 fathoms ($7^{m}3$), mud, whence the depths decrease gradually to the coast.

Open anchorage may be obtained about 1½ miles off the entrance of Khōr Ziārat, in a depth of 4 fathoms ($7^{m}3$), mud, whence the depths decrease gradually to the coast.

For a short distance north-north-westward of Khōr Ziārat, the coast is swampy, thence it becomes sandy with small rocky points, and is steep-to about one cable offshore. Lāvar is a small village about 3½ miles northward of Khōr Ziārat, and about 3 miles farther north-north-westward is Bālangistān, a small village, in which there is a square tower. About 2 miles north-north-westward of Bālangistān, there is a remarkable village standing on the bluff of a sandy hill about 60 feet ($18^{m}3$) high; in it are two square towers, the southern of which is a Customs-post and has a flagstaff; here there is a rough breakwater, for the use of small boats, which dries out and should be approached with caution; when approaching the village from north-westward, two prominent peaks, sickle-shaped with points opposed, will be seen.

Anchorage may be obtained by small vessels with local knowledge, in a depth of 3 fathoms ($5^{m}5$), about three-quarters of a mile offshore, with the sickle-shaped peaks bearing about 107°.

A red conical buoy, surmounted by a staff and globe, is moored off Bālangistān (*Lat. 28° 17′ N., Long. 51° 14′ E.*), in a depth of about 23 feet ($7^{m}0$), to mark the anchorage.

There are several villages situated on the coast between Bālangistān and Qalāt, about 8 miles north-north-westward.

Charts 2837, 2847, 2858, 748b.

Charts 2883, 2847.

COAST OF TANGISTAN.—Aspect.—The coast of Tangistan extends about 30 miles north-north-westward from Qalāt to Halīleh.

A range of coastal mountains, known as Kūh-e Mūnd or Kūh-e Kār, rises a few miles northward of Khōr Ziārat, continues along the coast of Tangistan for about 24 miles northward of Qalāt and then falls to the plain inland of Bushire. The plain between these hills and the sea is from one to 2 miles wide. Kūh Sehtanj or the Asses' Ears, one of the summits in the coastal range, rises, to an elevation of about 2,494 feet ($760^{m}2$), about 5 miles north-eastward of Qalāt; it consists of two pinnacles, close together, with a smaller one northward of them, and is a good mark. (*See* view C on chart 2847*b*). There are other peaks in this range, two of which, Kūh Khōr Shahabi and Delpari situated about 1½ and 3½ miles, respectively, northward of Kūh Sehtanj, attain elevations of 2,757 and 2,664 feet ($840^{m}3$ and $812^{m}0$), respectively, and form a saddle or notch, which is visible from north-westward.

From the rounded mountain 4,000 feet ($1219^{m}2$) high, mentioned on page 140, the main range of mountains trends north-north-westward. Kūh Khūrmūj, about 21 miles north-eastward of Kūh Sehtanj, one of the peaks in this range, is 6,430 feet ($1959^{m}9$) high and, except when close inshore, is visible above all parts of the coastal range; from south-westward, it appears as a long convex ridge, but from west-north-westward the ridge is end on and the mountain then appears as a fine peak with a long rounded slope on its northern side. *See* view facing page 141, view C on chart 2847 and view on chart 27.

The tidal streams off this coast are weak and often imperceptible.

Chart 2883.

Bārakī villages.—Anchorages.—This is the collective name of the eight southernmost villages on the coast of Tangistan. Karri, the southernmost, situated about one mile northward of Qalāt, has two towers, the northern being round and the southern square; there is also a remarkable palm. Good but open anchorage may be obtained off Karri, in a depth of 24 feet ($7^{m}3$) about 8 cables offshore.

Sālimābādeh, close northward of Karri, is easily identified by the very dark background which is peculiar to it; at its northern end there is a date grove and at its southern end are a few prominent palms. A square tower and a remarkable mosque stand about one mile northward of the village. About 4 miles northward of Karri is Khōr Shahabi, near the middle of which is a prominent square tower, and northward of it there is a date grove. At the northern end of this village there is a mosque, which, though obscured from northward, shows up well from southward. About 2 miles northward of Khōr Shahabi lies 'Umari. Bulkhair lies in a small bay northward of 'Umari; there are several date trees on either side of the village and a prominent round tower stands at its northern end.

Anchorage may be obtained by small vessels with local knowledge in Bandar Bulkhair, in a depth of 18 feet ($5^{m}5$), about three-quarters of a mile off the village (*Lat. 28° 32′ N., Long. 51° 05′ E.*).

Gāhi, a village, about one mile northward of Bulkhair, is nearly surrounded by date trees; off it there is a low sandy spit on which the sea always breaks; between Gāhi and Bulkhair there is a remarkable mosque. Rustami, about 1½ miles northward of Gāhi, is easily identified by a high round tower in the middle of the village. There is a prominent mosque about half-way between Rustami and Gāhi.

Charts 2858, 748b.

Chart 2883.

Landing can usually be effected at any of the Bārakī villages; there are several small points which afford protection from north-westerly winds.

The Bārakī villages should be approached with caution, as in some places depths less than those indicated on the chart have been found.

Chart 2847.

Coast.—Danger.—About 2 miles northward of Rustami (*Lat. 28° 34′ N., Long. 51° 05′ E.*) there is a low cliff, from about 2 miles northward of which, low cliffs extend for some distance along the coast.

Bāshi, about 7 miles northward of Rustami, is a village in which there is a large round tower, and near it is a date grove. In this vicinity, the coastal hills trend inland falling to the plain behind Bushire about 10 miles northward.

A shoal, with a depth of 16 feet (4^{m}9) over it, lies about 2 miles south-westward of Bāshi.

Nargiszār and Dilbar, situated, respectively, about 3 and 5 miles northward of Bāshi, are moderate sized villages surrounded by date groves.

Bandar Halīleh is entered between Bāshi and Ras Halīleh, about 14 miles north-westward; its shores are low and sandy, and over its greater part the depths are less than 12 feet (3^{m}7), chiefly mud. Khōr Khuvair, a small creek, the entrance to which dries, is entered near the head of the bay; near it there is a small fort and a date grove. About 2 miles north-westward of Khōr Khuvair is the mouth of a large creek which drains the Mashīleh; dry sands extend about a quarter of a mile off the mouth of the creek, which latter nearly dries. The Mashīleh is a large salt-water swamp which connects the dry land on which Bushire stands with the great plain inland of that place.

BUSHIRE AND APPROACHES. — Coast. — Anchorage. — Between the mouth of the creek which drains the Mashīleh and Ras Halīleh, the coast consists of a ridge of sand about 5 feet (1^{m}5) high, which is covered with tufts of coarse grass and increases in width from about a quarter of a cable at its eastern end. A solitary palm stood, in 1952, about 3½ miles eastward of the point.

Ras Halīleh is low, and from it a rocky spit extends about 4 cables south-westward. Halīleh is a village, about 7 cables north-north-westward of the point, and about a mile eastward of the point there are some clumps of date trees which extend inland to the marshes.

Good anchorage may be obtained by small craft during a shamāl, in a depth of 18 feet (5^{m}5), about half a mile offshore, with Ras Halīleh in line with the tower in the village, bearing about 329°.

Between Ras Halīleh and Ras Rīshahr, about 6½ miles north-westward, the coast is rocky with cliffs from which reefs extend about 2 cables. Two clumps of date trees stand about one mile northward of the village of Halīleh and thence the ground rises to a table-land, about 150 feet (45^{m}7) high, between the coast and the marshes.

Off-lying banks.—A detached bank, with a depth of 7 fathoms (12^{m}8), was reported by H.M.S. *Lapwing*, in 1903, to lie about 10 miles southward of Ras Halīleh, but its position is doubtful. A bank, with a depth of 10 fathoms (18^{m}3), lies about 9 miles south-westward of Ras Halīleh, its position being doubtful. A bank, with a depth of 11 fathoms (20^{m}1), was reported, in 1890, by H.M.S. *Sphinx* to lie

Charts 2858, 748b.

Chart 2847.

about 35 miles west-north-westward of Ras Halīleh. As none of these banks was closely examined, it is possible that the depths over them may be less than charted.

Chart 27.

Coast.—Anchorages.—Immediately eastward of Ras Rīshahr (*Lat. 28° 54′ N., Long. 50° 49′ E.*) there is a small bay, the shores of which are cliffy; on these cliffs are the conspicuous ruins of a white house surmounted by a white staff and triangle, and on the foreshore, south-westward of the ruins, is the conspicuous chimney of a distillery, 78 feet ($23^{m}8$) in height.

The telegraph buildings, situated about three-quarters of a mile north-north-eastward of Ras Rīshahr and the masts of a radio station, the central of which latter is about 200 feet ($61^{m}0$) high, are conspicuous.

Imāmzādeh, on the highest part of the land eastward of Ras Rīshahr, is a conspicuous domed mosque, 150 feet ($45^{m}7$) high, situated about 1½ miles eastward of the point. A small village surrounds the mosque. *See* view on chart 27.

The country house, which the British Resident used sometimes to occupy, is situated about half a mile southward of Imāmzādeh, and is conspicuous; there is also a flagstaff here.

In 1911, H.M.S. *Philomel* anchored, in a depth of about 4 fathoms ($7^{m}3$), about 2 miles offshore westward of the telegraph buildings; during a shamāl the ship dragged; whilst the north-west-going tidal stream was running a very heavy sea got up and it became necessary to put to sea.

In 1908, however, H.M.S. *Proserpine* anchored near the same position and rode out a shamāl, which lasted for three days, without dragging.

Indifferent landing, in calm weather, may be obtained under the ruins of the white house; but with any wind or swell it becomes impracticable.

Prohibited anchorage.—Anchorage is prohibited off Ras Rīshahr between imaginary lines drawn 220° and 265° from the ruins of the white house on the point; on the latter bearing, the ruins and Imāmzādeh are in alignment.

Coast.—Light.—Dangers.—A shoal, with a depth of 3 fathoms ($5^{m}5$), lies in the prohibited anchorage, about one mile west-south-westward of Ras Rīshahr, and another shoal with the same depth, lies about 7 cables westward of the point.

About a mile north-north-westward of Ras Rīshahr there is a small clump of date palms, and half a mile farther is Ras ash Shaghāb, which is the western extremity of a low, sandy projection, thence for 3½ miles northward the coast is low and sandy, thence cliffs, about 15 feet ($4^{m}6$) high, continue northward for about half a mile to the outskirts of the town of Bushire. From Ras Rīshahr to the town, the coast is fringed by a reef extending from one to 2½ cables offshore; in many places, rocky boulders, which dry about 3 feet ($0^{m}9$), lie on the outer edge of the reef.

A light is exhibited, at an elevation of 102 feet ($31^{m}5$), from a steel structure, 87 feet ($26^{m}5$) in height, painted red and white in horizontal bands, situated about 2½ miles northward of Ras Rīshahr. A light, for the use of aircraft, is also exhibited.

Mufqa'eh (Mufka'eh), about midway between Ras ash Shaghāb and

Charts 2858, 748b.

Chart 27.

Bushire, is a small fishing village, at which a break in the coastal reef forms a small boat harbour. A building, with high arched windows, two towers, and a flagstaff between them, stands at the southern end of Mufqa'eh, and is a good mark; another tower stands at the northern end of the village.

Two radio masts (*Lat.* *28° 57′ N., Long. 50° 50′ E.*), which are prominent, are situated about 1¼ miles east-south-eastward of the building at Mufqa'eh.

A remarkable building with two towers, surrounded by an extensive wall is situated on the coast about 1¼ miles north-north-eastward of Mufqa'eh, and about 7 cables farther northward is the old British Residency at Bushire, with a flagstaff near it.

Two 2-fathom ($3^{m}7$) patches lie about 1½ miles west-north-westward of the old British Residency.

A flat, with depths of less than 2 fathoms ($3^{m}7$) over it, extends northward and north-westward from Bushire and the coast in its vicinity, and westward from Jazīreh Shaikh Sa'ad (*see* below). On this flat are a number of sand banks, which dry from one to 3 feet ($0^{m}3$ to $0^{m}9$) in patches.

Raq'at as Sāfli, on the above flat, extends about one mile north-westward from Bushire; it dries about 2 feet ($0^{m}6$) in patches, and through it are small channels which are used at high water by boats with local knowledge as a short cut between vessels in the outer anchorage and the quay in Khōr Sultānī on the eastern side of Bushire.

Ras al Marg, the north-western extremity of the flats, is situated about 2 miles north-westward of the northern end of Bushire; it has depths of from 2 to 5 feet ($0^{m}6$ to $1^{m}5$) over it, and is steep-to on its north-western side; in 1939, it was reported to be extending westward. Kad Lakfeh, with depths of from 2 to 3 feet, extend about 1¼ miles eastward from Ras al Marg. The sea seldom breaks on Kad Lakfeh, except at very low water or during strong winds. Ras al Jabri is the north-eastern extremity of the sands.

Charts 27, 2847.

Raq'at al 'Ali, over which there are depths of less than 2 fathoms ($3^{m}7$), is the southern extremity of an extensive flat which extends southward from the coast eastward of Ras ash Shatt (*see* below) to a position nearly 3 miles west-north-westward of the old British Residency at Bushire.

In depths of less than 1½ fathoms ($2^{m}7$), the bottom is hard sand; in depths greater than 1½ fathoms ($2^{m}7$), it is sand and mud, and is softer.

Jazīreh Shaikh Sa'ad, on the eastern side of Bushire harbour, extends about 4 miles northward from a position about 2½ miles east-north-eastward of the old British Residency. Except for a narrow strip along its western and northern coasts, the island is low and swampy. The northern extremity of the island is rocky and about 10 feet ($3^{m}0$) high; on it are a large and conspicuous village and a small tower, about 50 feet ($15^{m}2$) high. A conspicuous solitary palm stands about 2½ miles southward of the tower.

Bar Abbāsak, the quarantine station, is situated at the southern end of Jazīreh Shaikh Sa'ad.

Chart 2847.

Shīf, in the district of Angāli, is situated about 1½ miles eastward

Chart 2847.

of the tower on Jazīreh Shaikh Sa'ad; it is a rocky point, about 25 feet ($7^{m}6$) high, on which there is a small building. Eastward of Shīf, the country is low, barren, and in places swampy for some miles; there are extensive swamps northward of it towards the Hilleh rūd district.

Ras Tahima lies about 1¾ miles north-north-westward of the northern end of Jazīreh Shaikh Sa'ad; it is a small sandy projection, from which rocks extend for some distance, and is occasionally used as a landing place at high water.

Ras ash Shatt lies about 9 miles westward of Ras Tahima (*Lat. 29° 06′ N., Long. 50° 52′ E.*) and 11 miles north-westward of Bushire. The northern side of the harbour, between Ras Tahima and Ras ash Shatt, is composed of extensive mud banks intersected by numerous large and deep creeks the entrances of which are shallow; on the mud banks are a number of drying sand knolls.

Ras ash Shatt is a narrow strip of sand, barely above water, eastward of which a swamp extends for many miles; the swamp is intersected by numerous creeks which are fairly deep inside but have depths of about 2 feet ($0^{m}6$) at their mouths. The point, and the banks off it, afford shelter to Bushire harbour, from the shamāl.

Chart 27.

Buoyage.—A conical light-buoy, painted black and white in horizontal bands, and exhibiting a *white group flashing* light showing *two* flashes, *every twelve seconds,* is moored in the outer anchorage about 4¼ miles west-south-westward of the old British Residency.

A conical light-buoy, painted black, and exhibiting a *red group flashing* light, showing *two* flashes *every twelve seconds,* is moored on the south-eastern side of Raq'at al 'Ali, about 2½ miles north-westward of the old British Residency.

A black conical buoy is moored off the north-western side of Ras al Marg.

Anchorages.—Channels.—Vessels whose draught will not permit them to enter the inner anchorage, should anchor in a depth of from 4¼ to 5 fathoms ($7^{m}8$ to $9^{m}1$), in the vicinity of the outer light-buoy, but clear and preferably southward of the prohibited anchorage, which latter lies within a radius of 3 cables from the light-buoy; this anchorage is exposed both to the shamāl and the kaus; sailing boats can fetch off with the prevailing winds.

In fine weather, a small steam vessel may obtain temporary anchorage, in a depth of 2¼ fathoms ($4^{m}1$), with the flagstaff of the old British Residency in Bushire bearing 045°, distant about one mile. Landing can be effected near the flagstaff.

Khōr Daireh (Deira), the name of the inner anchorage, is a bight in the flats which extends about 3 miles north-eastward between the south-eastern side of Raq'at al 'Ali and Ras al Marg. There are depths of from 2¼ to 2¾ fathoms ($4^{m}1$ to $5^{m}0$) in the approach, and the bottom is everywhere soft mud, but in the middle of the bight the depths increase to 3¾ fathoms ($6^{m}9$), mud, with good holding ground. Steam vessels with a draught up to 15 feet ($4^{m}6$) may enter this anchorage at any state of the tide unless the shamāl is blowing.

In the inner anchorage, the farther north-eastward the better is the shelter from the shamāl. A good berth is, in a depth of about 3½ fathoms ($6^{m}4$), with the flagstaff of the former residence of the Persian

Charts 2858, 748b.

Chart 27.

Governor, on the eastern side of Bushire, half a mile eastward of the old British Residency, bearing 149°, and the conspicuous solitary palm northward of Bar Abbāsak, 090°.

Bandar al Ghāwi, south-eastward of Ras al Jabri (*Lat. 29° 01′ N., Long. 50° 50′ E.*), is the local name of the anchorage, in depths of from one to 1¼ fathoms ($1^{m}8$ to $2^{m}3$), used by small native craft and sheltered by Kad Lakfeh.

Charts 27, 2847.

From the inner anchorage, a comparatively deep but narrow channel trends northward and eastward, passing about one mile westward of Jazīreh Shaikh Sa'ad and running round its northern end at a distance of about a quarter of a cable offshore. The large mudflats on the northern side of the channel dry. This channel passes about half a mile southward of Shīf, towards which a branch extends with a depth in it of 3½ feet ($1^{m}1$), and ends in a mud flat about 2 cables from Shīf.

Pilotage.—Vessels requiring a pilot should await his arrival at the outer anchorage. Weather permitting, he will always come out if required.

Directions.—In clear weather, the position of the vessel may be determined at some distance from the port by bearings of Kūh Gīsakān, Kūh Khūrmūj, and Kūh Sehtanj, *see* pages **244** and **146**, and view on chart 27, and view C on chart 2847.

Approaching from south-eastward, a vessel should steer to pass about 6 miles off Ras Halīleh, and thence continue north-westward in depths of not less than 6 fathoms ($11^{m}0$), anchoring according to draught southward of the light-buoy at the outer anchorage. From south-westward, the mosque at Imāmzādeh, and the old British Residency close southward of it, as well as the telegraph buildings at Ras Rīshahr will be the first objects sighted, showing white, especially in the afternoon sun. The depths decrease regularly as the coast is approached. Small vessels may keep near the coast, according to draught.

Approaching from northward, a vessel, when passing Ras ash Shatt, should not get into depths of less than 10 fathoms ($18^{m}3$) and should keep in that depth until the light-buoy marking the outer anchorage is sighted.

Chart 27.

From the outer anchorage, a vessel may approach with the flagstaff of the old British Residency at Bushire bearing 076° until the building with two towers at the southern end of Mufqa'eh bears 135°, when she should steer 000°, and when the Residency flagstaff bears 108°, she should steer 028° to the anchorage, passing eastward of the inner light-buoy. The least depth by this route is 2½ fathoms ($4^{m}6$).

If approaching from westward the vessel may keep the Residency flagstaff bearing 103° until the building with two towers at the southern end of Mufqa'eh bears 149°, and then steer 028° for the anchorage; the least depth by this route is 2¼ fathoms ($4^{m}1$).

Approaching from southward, the vessel may pass about one mile off Ras ash Shaghāb (*Lat. 28° 55′ N., Long. 50° 48′ E.*) and steer 359° until the Residency flagstaff bears 108°, thence steering 028° to the anchorage; the least depth by this route is 2½ fathoms ($4^{m}6$).

Tidal streams.—In the offing, the tidal streams set up and down the coast, with maximum rates of from half a knot to one knot.

Charts 2858, 748b.

Chart 27.

In the entrance of the harbour the tidal streams set northward and southward; near Raq'at as Sāfli, they set eastward and westward across the shoals at the mouth of Khōr Sultānī (*see* below).

In the inner anchorage they set from north-north-eastward to east-north-eastward, and from south-south-westward to west-south-westward; at spring tides they attain a rate of one knot, and at neaps, from a quarter to half a knot. Northward and eastward of the inner anchorage, the tidal streams over the flats are weak.

In Khōr Sultānī, the tidal streams are very strong off the town and round the northern end of Jazīreh Shaikh Sa'ad.

The July spring tide is the highest in the year.

The winds have considerable effect on the tides and tidal streams; the shamāl causes the streams to turn later and lowers the general level, sometimes as much as one foot (0^m3); the kaus, on the other hand, raises the general level.

Khōr Sultānī.—Buoy.—This large creek, with a shallow bar at its mouth, runs in south-eastward past the eastern side of Bushire and affords access to the quay.

Alafdān is the north-western extremity of an extensive sand and mud flat which extends from the southern end of Jazīreh Shaikh Sa'ad; it forms the north-eastern side of the entrance to Khōr Sultāni, and its northern extremity lies about 8½ cables northward of the northern end of the town of Bushire.

Ras Fūdar, on the southern side of Khōr Sultānī, about 1½ miles south-eastward of the former residence of the Persian Governor, is about 30 feet (9^m1) high.

Jazīreh-e Muharraq, north-eastward of Ras Fūdar, is swampy and on its south-western end, about 4 cables from that point, are some fishermen's huts; the island is nowhere more than about 3 feet (0^m9) high, and most of it covers at high water spring tides; that part of the flat extending from Jazīreh Shaikh Sa'ad, which lies northward of Jazīreh-e Muharraq island, is rocky.

Between the south-western end of Jazīreh-e Muharraq and Ras Fūdar, Khōr Sultānī bifurcates, the principal branch, Khōr Shakari (Lashkari), running in a north-easterly direction, southward of that island and Jazīreh Shaikh Sa'ad; and the other, Khōr Pūdar (Pooda), running south-eastward through a sandy plain which covers at high water springs for many miles.

About 5 miles south-south-eastward of Ras Fūdar there is a low point; between the creek and the rising ground towards Imāmzādeh are some groves of date trees and cultivated land.

Khōr Sultānī is approached across the great flat southward of Kad Lakfeh, in depths of from about three-quarters of a fathom to one fathom (1^m4 to 1^m8). In 1920, the approach was made, either by Khōr Bahrani southward of Ras al Marg, or northward, eastward, and south-eastward round Kad Lakfeh. Bāgalas with a draught of 10 feet (3^m0) use these passages, but local knowledge is necessary. As there is usually a confused sea on the bar, boats with a draught of more than 3 feet (0^m9) should be cautious of entering within two hours of low water. Abreast Alafdān (*Lat. 29° 00′ N., Long. 50° 50′ E.*), the entrance is about half a mile wide with depths in it of from one to 1¼ fathoms (1^m8 to 2^m3); abreast the town, it is about one cable wide with depths of from 4 to 7 fathoms (7^m3 to 12^m8), hard bottom.

Charts 2847, 2858, 748b.

Chart 27.

Bushire.—This, which was the principal seaport of Persia, is situated on a rocky ridge which does not exceed 40 feet (12^{m}2) in elevation. It is poorly built, and most of the streets are narrow. *See* view on chart 27. Since the construction of the trans-Persian railway and the development of the Shatt al Arab ports, Bushire has become of minor importance as a port.

As far as Sangi, a village situated about one mile southward of the town, the ground is swampy, and, with the exception of a narrow strip along the western coast, it covers at very high water. The land rises in a gradual slope to Imāmzādeh; in that direction there are also several small hamlets.

Bushire is the administrative headquarters of the Persian province of the Gulf ports, Dashtī and Dashtistān and, in 1952, had an estimated population of about 20,000. The Governor resides about 3 miles southward of the town; his offices are in one of the larger houses on the sea wall on the western side of the town. There are a number of European residents, and there are small Armenian and Roman Catholic churches in the town.

There is a Persian hospital.

Quarantine.—The town is healthy, but during the hot summer malaria is prevalent.

The Quarantine regulations are very strict and the authorities enforce all penalties. Passengers less than five days out of Bombay, or other infected ports, are landed there.

Trade.—The principal exports are cotton, opium, gum, poppy seed and mohair; general merchandise is imported.

Port facilities.—Fresh provisions may be obtained, but previous notice is required; vegetables are, however, scarce. No water is available for ships; the town depends on wells and private rainwater tanks.

Custom house quay, where there is a depth of about 3½ feet (1^{m}1) alongside, is situated in Khōr Sultānī, about half a mile south-south-eastward of the northern end of Bushire; it can be identified by a 10-ton travelling crane and a 7-ton fixed crane.

There is a jetty, with a depth of about 8 feet (2^{m}4) alongside, situated on the western side of the entrance to Khōr Pūdar, about 1½ miles south-eastward of Custom house quay.

In addition to the quay and jetty referred to above, landing may also be effected alongside the embankment which extends north-north-westward from Custom house quay (*Lat. 28° 59′ N., Long. 50° 50′ E.*).

Numerous dhows are available for lighterage, but there are no tugs. There are no repair facilities.

Communication.—Bushire is connected with the general telegraph system.

There is regular steamer communication with other ports in the Persian gulf. *See* page 18.

For communication by air, *see* page 18.

Radio station.—There is a radio station at Bushire. *See* page 18.

Climatic table.—*See* page 33.

Port regulations.—*See* page 15.

Charts 2847, 2858, 748b.

CHAPTER VI

PERSIAN GULF, SOUTH-WESTERN SIDE—COAST OF TRUCIAL ʽOMĀN, AND EASTERN SIDE OF AL QATAR—RAS ASH SHAʼM TO RAS RĀKĀN.

Chart 2837.

TRUCIAL ʽOMĀN.—General remarks.—The eastern portion of Trucial ʽOmān between Ras ash Shaʽm (*Lat. 26° 03′ N., Long. 56° 05′ E.*) and Abu Dhabi, about 133 miles south-westward, is throughout low and sandy; but the mountains of the Ruūs al Jibāl promontory are visible in clear weather until past Dibai, about 64 miles south-westward of Ras ash Shaʽm. This coast is remarkable for the high degree of refraction or mirage that is frequently experienced, especially in the early morning, when its features become greatly distorted, villages sometimes appearing as clumps of rounded trees, and small uncharted hillocks or dunes as hills of considerable height.

The towns are all very similar in appearance and are situated near the entrances of khōrs or salt-water creeks, of which there are many along the coast, often connected with one another or forming large backwaters in which native craft lie. Everything connected with these places seems to indicate a state of decay.

The similarity of appearance makes it difficult to distinguish one town from another.

Cattle, sheep and vegetables may be obtained at most places; mullet can be caught in all the khōrs, and fish, generally, is plentiful.

The Great Pearl bank, which includes the whole of the area on the Arabian side of the Persian gulf within depths of 20 fathoms ($36^{m}6$), begins about 60 miles south-westward of Ras ash Shaʽm, *see* page 96.

Anchorage.—The whole of the eastern portion of the coast of Trucial ʽOmān is open from south-west, through north-west, to north-east, and the bottom is in many places hard, the holding ground, in consequence, being bad. The wind blows from west-north-westward or even from westward during a winter shamāl, and when a shamāl approaches, vessels should quit their anchorage. In winter, vessels should anchor farther offshore than in summer.

Tidal streams.—The tidal streams off the coast set south-westward and north-eastward at a rate of about one knot.

Chart 753.

Coast.—Between Ras ash Shaʽm (page 96) and the town of Shaʽm, about 2 miles southward, the coast is fringed by a bank with depths of from 2 to 3 fathoms ($3^{m}7$ to $5^{m}5$), extending about one quarter of a mile off shore and is low and sandy, with a plain, partly cultivated, from one to 1½ miles wide, between it and the mountains of Ruūs al Jibāl.

Between Shaʽm and the town of Rams, 8½ miles south-south-west-

Charts 2858, 748b.

Chart 753.

ward, the coast continues low with mountains inland. The coastal bank, with depths of from 2 to 3 fathoms (3^{m}7 to 5^{m}5), extends from 2 to 10 cables offshore. A small ruined tower stands on a hillock, about 50 feet (15^{m}2) high, about one mile southward of Sha'm; from southward the hillock appears to have a peaked summit. Hanna, about 4 miles south-south-westward of Sha'm, is a village of mud huts on the northern side of a creek which may be entered by boats at high water. Whereas the coast northward of Ras ash Sha'm is comparatively steep-to, that south-westward of it is not so, depths of 10 and 20 fathoms (18^{m}3 and 36^{m}6), respectively, being found half a mile and 3 miles westward of Sha'm. The bottom, generally, is of sand.

The town of Rams lies on the south-eastern side of a lagoon, the entrance to which is obstructed by a bar on which the sea breaks; the seaward side of the lagoon is formed by a long sandy spit extending from south-westward; the lagoon is used by dhows. In 1922 it was reported that the depths off Rams were less than charted. The town may be identified by a round fort at the south-western end and a minaret at the north-eastern end. About a mile north-eastward of Rams is a hill fort named Zai which, however, does not show up well against its background of dark mountains. *See* view facing page 156. About 1½ miles south-south-westward of Rams (*Lat. 25° 53' N., Long. 56° 02' E.*) is the mouth of a small creek which trends southward and runs into Khōr Khaima. The coast in the vicinity is swampy but a short distance from it are date groves which extend far inland and continue southward, along the eastern side of Khōr Khaima.

Chart 3791, plan of Ras al Khaimah.

Khōr Khaima.—Ras al Khaima is the extremity of a low sand spit which extends, parallel with the coast, for about 3½ miles in a north-easterly direction, to a position about the same distance south-westward of Rams, and encloses a shallow lagoon.

The town of Khaima, situated at the south-western end of the spit, consists chiefly of stone buildings; at the northern end of the town there is a white rectangular house with high windows, which, standing considerably higher than the surrounding buildings, is a good mark.

A conspicuous fort, with two square towers, stands on the wall built across the peninsula at the southern end of the town, and near it there is a large and conspicuous tree. A detached tower, which, in 1935, was in ruins, stands about 4 cables south-westward of the fort, and another one, which is prominent, about one mile farther south-westward, near the foot of some red sand hills. A white circular tower stands on the northern summit of these hills, at an elevation of about 80 feet (24^{m}4), about 2 miles southward of the fort.

Chart 753.

In the vicinity of Khaima the plain is about 6 miles wide, but its width increases rapidly south-westward, so that from northward the town appears to be situated where the mountains end. The red sand hills are about 130 feet (39^{m}6) high, and extend about 12 miles south-westward; from westward their northern end affords a guide to the locality. The tower at their south-western end is small and inconspicuous; it is only visible from westward.

Charts 2837, 2858, 748b.

Chart 3791, plan of Ras al Khaimah.

Khōr Khaima is entered at the northern end of the sand spit and should be approached from north-eastward keeping close to the coast. There is a depth of 2 feet ($0^{m}6$) in the entrance; inside the khōr there are depths of 9 feet ($2^{m}7$) as far as the town, close behind which native boats lie.

In 1949, it was reported that the passage into the lagoon, though long, was clear and easily accessible by boats drawing about 3 feet ($0^{m}9$).

In 1953, it was reported that the passage into the lagoon was most unstable, and that large dhows sometimes get marooned inside. While at other times there is a least depth of 10 feet ($3^{m}0$).

The towers shown on the plan on chart 3791 on the eastern side of the lagoon are obscured by trees and are scarcely visible from seaward.

Anchorages.—Dangers.—A good berth is in a depth of 5½ fathoms ($10^{m}1$) with the fort at Ras al Khaima bearing 138°, distant about 3½ miles. Small vessels may anchor in a depth of 4¼ fathoms ($7^{m}8$) with the fort bearing 123°, distant about 19 cables. The holding ground is good, and it is considered locally that there is not so much sea at this anchorage during a shamāl as there is at other places in the vicinity.

Caution is necessary when approaching the anchorage for there are patches, with depths of from 15 to 18 feet ($4^{m}6$ to $5^{m}5$), lying within 3½ miles of the coast in the vicinity of, and south-westward of, the anchorages. The locality has not been thoroughly examined; the bottom consists mostly of sand. A small shoal, with a depth of less than 6 feet ($1^{m}8$), lies about one mile north-westward of the fort, and another, with a depth of 9 feet ($2^{m}7$), lies about 1¼ miles north-north-westward of the fort (*Lat. 25° 48′ N., Long. 55° 57′ E.*).

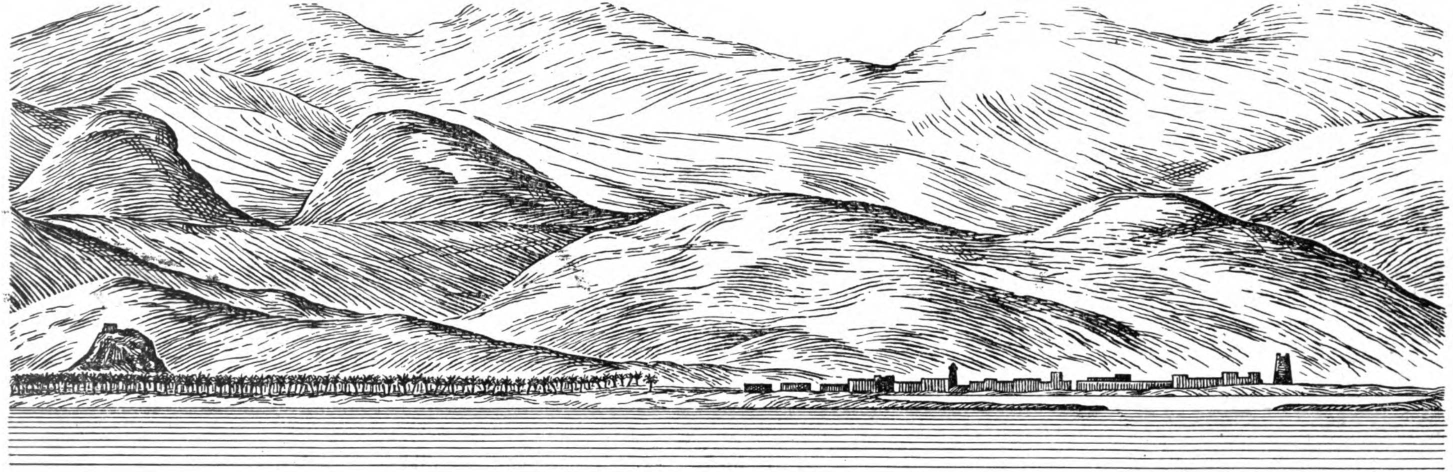
Chart 753.

Coast.—Jazīrat al Hamra lies close off the mainland, about 12 miles south-westward of Ras al Khaima, and on it is the town of Hamra. Viewed from south-westward, it does not appear as an island. At the town there is a fort which has several towers and in which there are a few round trees; close to the fort is a high square tower with two rows of windows, and a high slender tower stands at the western end of the town. There are no date groves, but a solitary palm stands near a tower at the eastern end of the town. The population, in 1951, was about 2,500 and the principal industry pearl fishing. The south-western end of the red sand hills, mentioned on page 155, lies about 3 miles southward of the town, and between a conspicuous tower stands on a hillock. *See* view facing page 157.

Ras Abu Ahmad, about three-quarters of a mile north-eastward of Jazīrat al Hamra, is a low sandy point at the entrance to an inlet, which trends south-westward between the town and the strip of sandy beach forming the mainland; there are depths of from 2 to 3 feet ($0^{m}6$ to $0^{m}9$) in the entrance, and from 7 to 8 feet ($2^{m}1$ to $2^{m}4$) inside, but off the town the inlet is shallow.

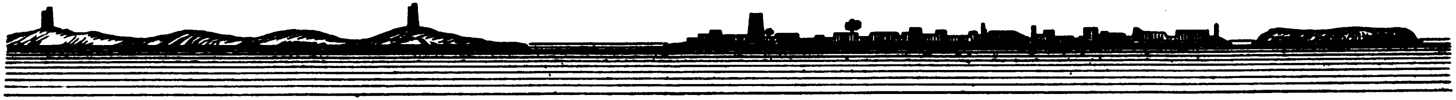
Between Jazīrat al Hamra and Khōr Umm al Qaiwain, about 14 miles south-westward, a reef, which nearly dries in places, and was reported in 1911 to be extending seaward, extends from one to 1½ miles offshore, and by day shows up well. About 10 miles south-westward of Jazīrat al Hamra there are depths of 2 fathoms ($3^{m}7$)

To face page 156

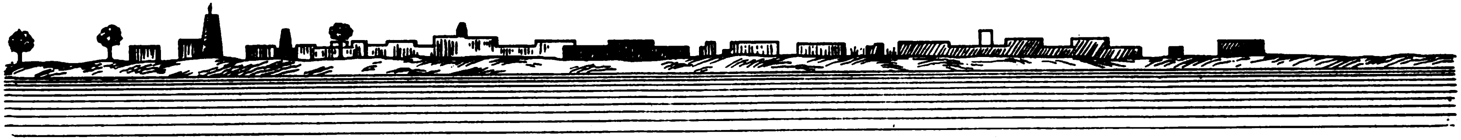

Zai fort.
Thick date palms.
Rams minaret.
Fort.

Town of Rams from 150 yards westward of the northern entrance.

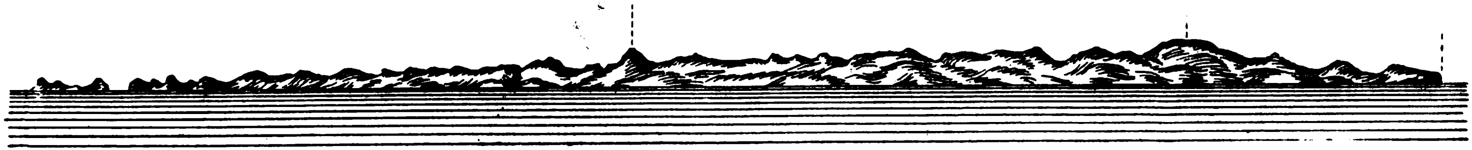
(*Original dated* 1951.)


Tower bearing 205°.
Red sand hills.
Tower bearing 210°.
Fort bearing 215°, distant 2¼ miles.
Prominent red sand hills.

Jazīrat al Hamra from north-eastward.


Tower bearing 108° distant one mile.

Village of Al Hamrīya.


Prominent cone-shaped hill.
Hill bearing 328°.
Prominent cliff edge.

Jazīrat Dalma.

(*Originals dated* 1951).

Chart 753.

lying about 2 miles offshore; this part of the coast has not been thoroughly examined.

Chart 3707.

Khōr al Baidha, the entrance of which is situated about 7 miles south-westward of Jazīrat al Hamra, trends south-westward and affords communication with Khōr Umm al Qaiwain, but it is only available to small boats with local knowledge.

Chart 3705, plan of Umm al Qaiwain.

Khōr Umm al Qaiwain.—This inlet, which is an extensive backwater in which there are several low islets, is entered between the south-western extremity of Jazīrat Seneya, situated on the seaward side of Khōr al Baidha, and the peninsula of Umm al Qaiwain.

Jazīrat Seneya, which is about 5 miles in length, is low-lying with sandhills covered with grass and scrub. Berij Milah, a conspicuous square structure, stands near the centre of the island, and near the south-western extremity there is a conspicuous hut. Two conspicuous trees stand, respectively, about 4 and 8½ cables south-westward of Berij Milah.

The peninsula of Umm al Qaiwain, on which stands the town of Umm al Qaiwain, is connected with the mainland westward of it by a narrow isthmus just over half a cable in width. Near the centre of the town there stands the Shaikh's fort, a conspicuous square building with two round towers and a flagstaff. Berij Bakhut, a conspicuous structure, stands on the eastern side of the peninsula; on the southern side of the town, and also westward of the isthmus, there are several other towers, of which Berij Mahsum is conspicuous.

Large banks, on which there are patches that dry, extend seaward from Jazīrat Seneya and from the peninsula of Umm al Qaiwian; between these two banks there is a narrow channel leading to Khōr Umm al Qaiwain.

The inlet is approached from a position about 1¾ miles northward of Berij Bakhut (*Lat. 25° 35′ N., Long. 55° 35′ E.*). The approach channel runs in a southerly direction and is narrow and tortuous; the bar, over which there is a least depth of 2 feet ($0^{m}6$), lies about midway between the channel entrance and the entrance to the inlet. Northward of the bar, depths of about 6 feet ($1^{m}8$) can be carried by boats with local knowledge; southward of the bar, depths gradually increase to as much as 6 fathoms ($11^{m}0$).

Within the entrance the inlet splits into three arms. The eastern arm connects with Khōr al Baidha; the southern and western arms are divided by an extensive drying bank on which lies Jazīrat al Ghubba, a low-lying straggling islet distinguished by a conspicuous tree. The eastern and western arms of the inlet are shallow but, in the southern arm, a depth of about 19 feet ($5^{m}8$) can be carried south-eastward to a position about three-quarters of a mile south-eastward of the south-eastern extremity of Jazīrat al Ghubba; beyond that, there are general depths of from 9 to 12 feet ($2^{m}7$ to $3^{m}7$) for a farther 1¼ miles southward.

Anchorage.—Anchorage outside the inlet may be obtained, in depths of from 6 to 7 fathoms ($11^{m}0$ to $12^{m}8$), about three-quarters of a mile north-westward of Berij Mahsum; in winter, vessels should anchor farther out in a depth of 8 fathoms ($14^{m}6$).

Landing on the shores outside the inlet is bad, except in fine weather.

Charts 753, 2837, 2858, 748b.

Chart 3707.

Coast.—The coast between Khōr Umm al Qaiwain and Al 'Ajmān, about 13 miles south-south-westward, is low and sandy, and in the vicinity of the various villages there are a few date palms.

The depths offshore are regular and the bottom is rocky; between Khōr Umm al Qaiwain and a position about 2 miles north-eastward of Al 'Ajmān, there are depths of 5 or 6 fathoms ($9^{m}1$ to $11^{m}0$) about one mile offshore.

Vessels should not anchor close inshore, for there there is a liability of losing an anchor.

At Al Hamrīyah, about 7 miles south-south-westward of Khōr Umm al Qaiwain, there is a fort with a tower at its southern end, which is a good mark. Near the north-eastern end of the village there is a date grove. *See* view facing page 157.

In 1922, H.M.S. *Cyclamen* anchored, in a depth of 4¼ fathoms ($7^{m}8$), sand, about half a mile offshore; and, in 1931, H.M.S. *Penzance* anchored, in a depth of 5 fathoms ($9^{m}1$), sand, with the fort bearing 140°, distant 9 cables.

Landing may be effected in a creek on the southern side of Al Hamrīyah; but there is a bar at its entrance.

Chart 3791, Al 'Ajman, Sharjah and Dibai.

Al 'Ajmān.—Dangers.—This town, in which there is a fort with a tall tower, is situated on the south-eastern side of Khōr Al 'Ajmān. The fort is small but high, and its tower, from which the Shaikh's flag is displayed, is 65 feet ($19^{m}8$) high and conspicuous. (*See* view facing page 164). Berij al Mai, a watch tower 46 feet ($14^{m}0$) high, stands about 7 cables south-south-westward of the fort.

A shoal, with a depth of 16 feet ($4^{m}9$), lies about 7 cables offshore north-westward of the fort. The depths in the vicinity are irregular, and the coast should not be approached at night into depths of less than 10 fathoms ($18^{m}3$).

Anchorage off Al 'Ajmān is bad, the bottom being hard coral and sand. In 1932, H.M.S. *Fowey* anchored, in a depth of 4 fathoms ($7^{m}3$), with the fort bearing 139°, distant 1¼ miles.

Khōr Al 'Ajmān is the easiest of access of any on this coast and is available to dhows. The entrance is north-westward of the fort, between the extremities of two sand spits which extend about 2½ cables offshore; the bar, which is of sand, has a depth of 2 feet ($0^{m}6$) over it. Within the bar are two channels, one trending south-westward past Al 'Ajmān, and the other, extending about half a mile east-north-eastward into Khōr Zora. The latter channel, in which there are depths of from 4 to 8 feet ($1^{m}2$ to $2^{m}4$), extends close along the southern side of the north-eastern entrance point and then opens out into drying lagoons forming Khōr Zora. Off the town, there are depths of 2 fathoms ($3^{m}7$) in the inlet.

Coast.—A date grove extends about one mile south-westward from Al 'Ajmān, thence to Al Hairah (*Lat.* 55° 23′ *N.*, *Long.* 55° 24′ *E.*), situated about 2¼ miles south-westward of the fort at Al 'Ajmān, there is a clear uncultivated space, in which there is a watch tower, 63 feet ($19^{m}2$) high, which shows up well from north-westward; between Al Hairah and the northern end of Shārjah, about 1¼ miles south-westward, the date groves are continuous. At Al Hairah, there are two detached towers and a small ruined tower about one cable south-eastward of the southern tower. There are several villages between

Charts 753, 2837, 2858, 748b.

Chart 3791, Al ʻAjman, Sharjah and Dibai.

Al Hairah and Shārjah, but from seaward they appear to be connected to Shārjah.

Shārjah.—Lights.—This, the largest and most important town in Trucial ʻOmān, extends about 1¼ miles along the eastern bank of Khōr Shārjah, which trends south-westward parallel with the coast; in it are several detached towers of unequal height and a fort. The Shaikh's residence is a large white two-storied building; his flag is displayed from the eastern tower of the fort, 46 feet (14^{m}0) high, situated about one cable northward of his residence.

Red lights are exhibited from six radio masts, each 100 feet (30^{m}5) high, standing about a mile east-north-eastward of the Shaikh's residence.

Great Britain is represented by an Arab who is the agent of the Political Resident in the Persian gulf; his house is about 4 cables north-north-eastward of the fort, and from its roof the Union flag is displayed when any of H.M. Ships are lying at anchor off the town.

Laiya (Aliya) is a large suburb of Shārjah, situated on the seaward side of Khōr Shārjah, about a mile westward of the fort. A two-storied square house with a tower stands at the southern end of Laiya, but most of the village is composed of mat huts; a few mud buildings stand on the sandy spit close north-eastward of Laiya.

At the southern end of Shārjah some rocky rising ground extends to a bluff, 27 feet (8^{m}2) high, on the bank of Khōr Shārjah; there is a small ruined tower about 4 cables south-eastward of the bluff. The beach in front of Laiya is of white sand, but the bluff and Ras Laiya, a small rocky projection, which, when in line with the latter bears about 167°, are both dark coloured though inconspicuous until close to.

Khōr Shārjah is very small and shallow, and its entrance lies west-north-westward of Berij Sharqān, 65 feet (19^{m}8) high and prominent, which is situated 1½ miles north-eastward of the fort; the depth on the bar is about one foot (0^{m}3). After passing the town, the creek winds round the bluff and opens out into a wide though shallow lagoon and eventually joins with Khōr Khān, south-westward of it.

Anchorage.—In order that the sea breeze may be a leading wind for sailing boats proceeding to and from the landing place, vessels should anchor with Ras Laiya (*Lat. 25° 22′ N., Long. 55° 22′ E.*) bearing between 180° and 160°, in summer, in a depth of about 5 fathoms (9^{m}1), and in winter, in a depth of about 7 fathoms (12^{m}8); in either case the holding ground is bad, being rock and coral covered with a little sand. In 1931, H.M.S. *Penzance* anchored, in a depth of 4½ fathoms (8^{m}2), with the fort bearing 130°, distant about one mile.

A good leading line for approaching the anchorage is the flagstaff of the British Agent's Residency in line with the 56-foot (17^{m}1) tower, situated about three-quarters of a mile south-eastward of it, bearing about 149°.

Caution must be exercised when approaching the anchorage from west-north-westward for a southerly set is often experienced after passing Jazīrat Sirri (page 127).

The best landing place is not in the creek, at the entrance of which there is usually some surf, but on the sandy spit protecting the creek, directly opposite the British Resident Agent's house, or under the lee of the rocks at Ras Laiya; the latter is the most convenient except at

Charts 3707, 753, 2837, 2858, 748b.

Chart 3791, Al ʻAjman, Sharjah and Dibai.

low water. From either of these landing places the creek has to be crossed to reach Shārjah, but ferries are usually available.

Coast.—Danger.—Khān is a village situated on the northern side of a small creek about 2 miles south-westward of Laiya. It is the most easily distinguished village in the neighbourhood, the country in the vicinity being low and swampy for some miles inland. Khōr Khān divides into two branches, one trending northward into the lagoon southward of Shārjah, and the other extending south-westward towards Daira. Khān village consists chiefly of mat huts, but in it are two round towers, one square tower and a conspicuous minaret, 40 feet ($12^{m}2$) high. *See* view facing page 164.

Abu Hail is a small rush village about 2 miles south-westward of Khān minaret and is inhabited during the date-picking season only; the northern side of this village, which is not conspicuous, marks the approximate boundary between the Shārjah and Dibai territories. About three-quarters of a mile farther south-westward is a small group of huts, used as a quarantine village and known as Ferij al Muhadhām.

A detached shoal, with a depth of 18 feet ($5^{m}5$), lies about 1¼ miles north-westward of Berij Nahar, a castellated structure, 54 feet ($16^{m}5$) in height, situated about 1½ miles south-westward of Ferij al Muhadhām.

There is no good anchorage off this stretch of coast; the holding ground is bad and vessels anchoring should veer plenty of cable.

Chart 3705, plan of Dibai.

Dibai.—Dangers.—Anchorages.—Dibai is situated a short distance inland on the southern side of Khōr Dibai, and from it a date grove extends about 2 miles south-westward, terminating in a detached clump.

Daira is a large suburb consisting of mat huts, amongst which stand a number of well-built houses, most of which latter have square towers with pillared tops; it stands on the north-eastern side of Khōr Dibai, on a point formed by a sharp bend in the creek. Shandagha is a suburb of Dibai and is situated on the spit which forms the western side of the entrance to Khōr Dibai.

Dibai contains the residence of the Shaikh. There are several tall towers in Dibai; the fort is a conspicuous square building with a round tower (*Lat.* 25° 16′ *N., Long.* 55° 18′ *E.*), 56 feet ($17^{m}1$) high, on its south-western corner, from which the Shaikh's flag is displayed. There is a hospital.

Berij Nayif, square, white, conspicuous and 63 feet ($19^{m}2$) high, and a minaret, 69 feet ($21^{m}0$) high, about 7 and 8 cables north-eastward of the fort, respectively, are identifiable on approaching Dibai.

The north-eastern part of Daira is known as Ferij al Balush. There is a small minaret in Daira, 40 feet ($12^{m}2$) high, situated about half a mile north-north-eastward of Dibai fort, which is fairly prominent from north-westward and a useful mark when entering the inlet.

Anchorage may be obtained off Dibai, but the holding ground is bad and there is no shelter from the shamāl. A vessel should not anchor in depths of less than 4 fathoms ($7^{m}3$). A good berth is in a depth of 6 fathoms ($11^{m}0$) about one mile offshore, or in 5 fathoms ($9^{m}1$), with the fort bearing 160°, distant about 13 cables. In 1911, H.M.S. *Alert* anchored in the latter position but, with a westerly wind of force 4, the sea rose considerably in three hours and, having dragged both anchors, the vessel had to put to sea. Smaller vessels may anchor

Charts 3707, 753, 2837, 2858, 748b.

Chart 3705, plan of Dibai.

in a depth of about 5½ fathoms (10^{m}1), with the fort bearing 156° distant about 11½ cables.

In 1932, H.M.S. *Fowey* anchored in a depth of 7½ fathoms (13^{m}7), with the fort at Dibai bearing 121°, distant 18 cables, and in this position rode out a moderate shamāl, the force of wind being 6-7, with a heavy swell.

In 1949, H.M.S. *Loch Quoich* anchored with the fort beating 101°, distant 17 cables, and found the holding ground quite good.

Khōr Dibai.—This inlet is entered about half a mile northward of the fort at Dibai; its western entrance point is low and sandy, and from it a spit, which dries one foot (0^{m}3) at its outer end, extends about 4½ cables north-eastward. The entrance, which is reported to be constantly changing and is much obstructed by a stony flat, has depths of about one foot (0^{m}3), the bottom in places being rocky.

In 1948, Berij Nayif, bearing about 144°, led over the bar. In 1949, the passage into the inlet for a boat drawing about 3 feet (0^{m}9), was found to be easily accessible at all states of the tide. The channel winds southward and passes close to the western entrance point, and thence turns eastward. A spit, which dries 3 feet (0^{m}9), extends south-westward from a point on the northern side of the channel where it turns eastward; thence the channel follows the northern shore, passing northward of a shoal which dries and lies about midway between the two shores. The deepest part of the inlet lies between the above-mentioned spit and the drying shoal, and depths of from 7 to 27 feet (2^{m}1 to 8^{m}2) exist here between the two shores for about 3 cables. The Customs jetty is situated on the southern side of Khōr Dibai about a cable northwardof Dibai fort (*Lat. 25° 16′ N., Long. 55° 18′ E.*), and is reported to have a depth of 3 feet (0^{m}9) alongside. A pier projects from the southern shore close northward of a large white house situated about 3 cables west-north-westward of the fort. Khōr Dibai extends several miles south-eastward, but above the town, is only used by fishermen. Several ferries ply between Daira and the towns opposite.

Chart 3707.

Coast.—The coast between Dibai and Abu Dhabi, about 70 miles south-westward, is, except for a small village, at which there are some date trees, situated about 4 miles south-westward of Dibai, quite barren, uninhabited, and very low and uniform in appearance; here and there tufts of coarse grass grow on hillocks, separated by creeks, or, in places, by extensive swamps; there is no tree larger than a mangrove bush.

Landing unarmed on the mainland between Dibai and Abu Dhabi is not recommended, for it is often visited by Bedouin from the interior.

Jabal al 'Āli, about 16 miles south-westward of Dibai and about 3 miles inland, is a flat-topped hill, 220 feet (67^{m}1) high, which rises gradually from either end; it is the only prominent landmark on or near this part of the coast. On the coast westward of it stands a conspicuous chimney, and on the hill stands a conspicuous oil rig from which an obstruction light is exhibited, and a cairn with a white cross (*Lat. 25° 02′ N., Long. 55′ 07′ E.*).

Chart 3705, plan of Jebajib bay.

Dōhat Jebajib.—This bay, which is in fact only a slight indentation in the coast, is situated about 7 miles west-south-westward of Jabal

Chart 3705, plan of Jebajib bay.

al 'Āli. The 3-fathom (5^m5) line here lies about half a mile offshore but shoals, with a least depth of 17 feet (5^m2) over them, lie farther seaward. The coast in the vicinity is fringed by shelving reef in places behind which irregular sand hills and hummocks rise to a height of 30 feet (9^m1).

Chart 3707.

Ras Hasa, about 30 miles south-westward of Dibai, is a small rocky point which projects slightly from the line of the coast; it shows as a small dark patch in the white sand, but can only be identified when close inshore. Between Dibai and Ras Hasa the soundings are regular, depths of 3 fathoms (5^m5), fine sand, being found at a distance of about 8 cables offshore.

About 5 miles south-westward of Ras Hasa, and similar to it, is Ras Kantūt.

Chart 3705, plan of Khōr Al Ghanādha.

Khōr Al Ghanādha.—Beacons.—Buoyage.—Khōr Al Ghanādha is entered about 3½ miles south-westward of Ras Kantūt through a narrow channel with depths of from one foot to 21 feet (0^m3 to 6^m4) in it; the deepest part is about 2 cables southward of Ras Al Ghandāha, the eastern entrance point. The entrance channel was, in 1950, marked by six black can buoys. Maude and Dickson beacons stand on Ras Ghanādha and 5½ cables east-north-eastward of the point, respectively.

Anchorage, in a depth of about 8 feet (2^m4), is shown on the plan about 8 cables northward of Ras Al Ghanādha.

Chart 3707.

From Khōr Al Ghanādha to Abu Dhabi, about 30 miles south-westward, there is a succession of inlets, the majority of which are inter-connected with merely narrow strips of sand between them and the sea. Some of these inlets have deep water within, though their entrances are very shallow, and the whole form extensive swamps and backwaters which extend inland for many miles.

Ras Hanjūra, about 8 miles south-westward of the entrance to Khōr Al Ghanādha, is the low sandy northern entrance point of Dōhat Hanjūra, which is shallow, and the shores of which are intersected by many creeks. Maraifjain, situated about 4 miles southward of Ras Hanjūra, is the low sandy southern entrance point of Dōhat Hanjūra. Both points can be identified from a distance of about 5 miles. A small cliff, with a slightly overhanging top, stands at the head of Dōhat Hanjūra and is the southern end of a small tableland from 20 to 30 feet (6^m1 to 9^m1) high; it can be identified from a distance of about 7 miles and serves as a guide to the bay. *See* view B on chart 3707.

Hadd at Thalei is an extensive reef which, beginning near Ras Hasa, fringes the coast to a position about 2½ miles south-westward of the fort at Abu Dhabi, and in the vicinity of Maraifjain extends for about 6 miles offshore. There are depths of 5 and 6 fathoms (9^m1 to 11^m0) close outside this reef and soundings are not a good guide when approaching it as the bottom is uneven. Prior to 1870 the natives stated that there was a boat channel inside the reef which was used by them during a shamāl.

Chart 3705, Khōr Essādiyāt.

Ras al Gharab (*Lat. 24° 37′ N., Long. 54° 30′ E.*), about 11 miles

Chart 3705, Khōr Essādiyāt.

south-westward of Ras Hanjūra, is a rocky point near which are some low sand hills; the edge of the reef is about 3 miles from the point.

Khōr Essadiyāt.—Beacons.—Buoy.—Khōr Essadiyāt is entered between Ras al Gharab and Ras Sādiyāt, about 2 miles south-westward. The approach channel, the outer end of which was, in 1950, marked by a barrel buoy, has depths of from 12 to 25 feet (3^{m}7 to 7^{m}6) in it; thence the depths decrease towards Ras Sādiyāt off which there is a bar with depths of from 4 to 8 feet (1^{m}2 to 2^{m}4); within the bar the depths increase and there are depths of from 6 to about 17 feet (1^{m}8 to 5^{m}2) for a distance of about 4 miles to Camp island where the channel turns southward along the eastern side of Jazīrat Ramhan and the depths decrease again; Jazīrat Ramhan is covered with mangroves; there is also a channel which leads along the south-western side of the island but it is shallow, with depths of from 3 to 11 feet (0^{m}9 to 3^{m}4) in it.

In 1950 a beacon stood on the eastern side of Ras Sādiyāt; also on the three islets lying about 2½ and 2¾ miles south-south-eastward of Ras Sādiyāt; a beacon also stood on the drying reef off the northern extremity of Jazīrat Ramhan and on the western extremity of Jazīrat Fahad, an island about 2 miles south-south-westward of Camp island.

Chart 3707.

Coast.—Ras Laffān, about 8 miles south-westward of Ras al Gharab, is a low point on the northern side of an inlet which trends southward and joins the great backwater southward of Abu Dhabi.

Chart 3705, plan of Abu Dhabi.

Abu Dhabi.—Dangers.—This town consists for the most part of huts and extends along the coast for nearly 2 miles. In the town there is a small fort, partially surrounded by trees, with five towers close together, on one of which is the flagstaff (*Lat. 24° 29′ N., Long. 54° 20′ E.*). A small tower stands on the beach, where there are several prominent stone buildings, one of which is erected on the low sandy point which projects slightly in a north-westerly direction from the town.

The coast in the vicinity of Abu Dhabi is very low and the beach is of white sand; the only landmarks are the fort, a minaret, situated about half a cable, and a flagstaff situated about 3½ cables, northward of the fort. (*See* view facing page 165). There are a few stunted trees about one mile inland of the town.

A new fort, the position of which is approximate, is shown on the chart about 7 cables eastward of the fort mentioned above.

A shoal, with depths of from 9 to 18 feet (2^{m}7 to 5^{m}5), extends 1½ miles north-westward from a position about 1½ cables from the sandy point at the town. A coral reef, with depths of from 3 to 6 feet (0^{m}9 to 1^{m}8) over it, lies on the inshore end of the shoal, with a channel, in which there is a depth of 12 feet (3^{m}7), between it and the coast.

A rock, with a depth of 18 feet (5^{m}5) over it, lies nearly 2½ miles north-westward of the fort at Abu Dhabi. A 15-foot (4^{m}6) patch lies about 2½ miles northward of the fort and nearly one mile offshore, eastward of it the depths appear to be shoal.

Chart 3707.

About 2½ miles south-westward of the fort at Abu Dhabi is the mouth of a channel leading into a large backwater, 3½ miles wide at

Chart 3707.

its entrance and extending inland for a considerable distance. The greater part of the inlet is shallow and it has not been surveyed; but in it are many deep channels and several islands. This inlet is connected by a channel with Khōr Laffān, thus Abu Dhabi becomes an island; there is, however, one place which is fordable at low water.

Charts 3705, plan of Abu Dhabi, 3707.

Anchorage.—Directions.—The anchorage for larger vessels is in depths of from 4 to 5 fathoms (7^m3 to 9^m1), with the fort bearing not more than 122° distant from 2 to 2½ miles; but caution is necessary on account of the proximity of the 18-foot (5^m5) rock; this position is open seaward and the holding ground is bad, consisting of coral which is bare in some places and only lightly covered with sand in others. The sandy point about 2 miles south-westward of the fort, is of very white sand and is quite clearly defined when close to the anchorage; it forms a useful mark by which to anchor. It was reported, in 1948, that this point was not easy to distinguish beyond a distance of four miles offshore and became difficult to distinguish within 1¼ miles of the shore when approaching the anchorage off the fort.

In 1931, H.M.S. *Penzance* anchored, in a depth of 3 fathoms (5^m5), sand and coral, with the fort (*Lat. 24° 29′ N., Long. 54° 21′ E.*) bearing 123°, distant 8¼ cables; this position was found to be too far northward.

H.M.S. *Wren*, in February, 1948, approached the anchorage with the fort bearing 114°, and anchored with the fort on the same bearing, distant 8½ cables, in a depth of 3 fathoms (5^m5). Between 1¾ miles and 6½ cables of the shore, with the fort bearing 114°, depths were found to be 3 feet (0^m9) less than those charted.

Small vessels with local knowledge, with a draught up to 12 feet (3^m7), may anchor between the coral reef and the coast, in a depth of about 2½ fathoms (4^m6), with the fort (*Lat. 24° 29′ N., Long. 54° 21′ E.*) bearing 174°, distant about 6 cables; this anchorage is sheltered by the reef, but it is usually fully occupied by native craft.

A vessel approaching Abu Dhabi from north-eastward should give Hadd at Thalei a wide berth.

A vessel approaching from northward should first make Jazīrat Sir Abu Nuʻair (page 166), its summit should be brought to bear 356°, astern, and kept so, a course of 176° being made good after losing sight of it, care being taken to avoid the 21-foot (6^m4) patch, situated about 14½ miles northward of the fort of Abu Dhabi (*see* page 163). The depths are irregular which cause considerable overfalls. The tidal streams set north-eastward and south-westward and probably attain a rate of about one knot.

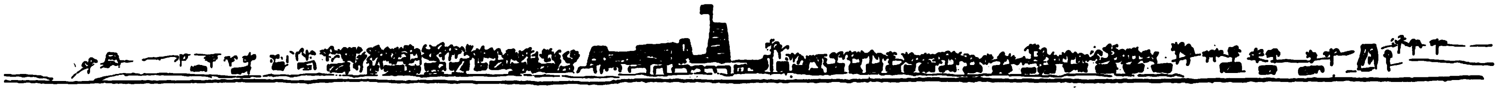
Jabal Fatasia, about 8½ miles south-south-westward of the fort at Abu Dhabi, when first seen from seaward appears dark in colour, but on nearer approach the white sand, of which its lower part consists, becomes visible.

A good lookout should be kept from aloft, for there are depths of 8 fathoms (14^m6) close to the reefs; the reefs north-eastward of Abu Dhabi should be given a good berth. Having identified the fort, anchorage may be obtained as previously directed.

The inner anchorage may be approached with the fort bearing 122°; this will lead close south-westward of the coral reef which shows up

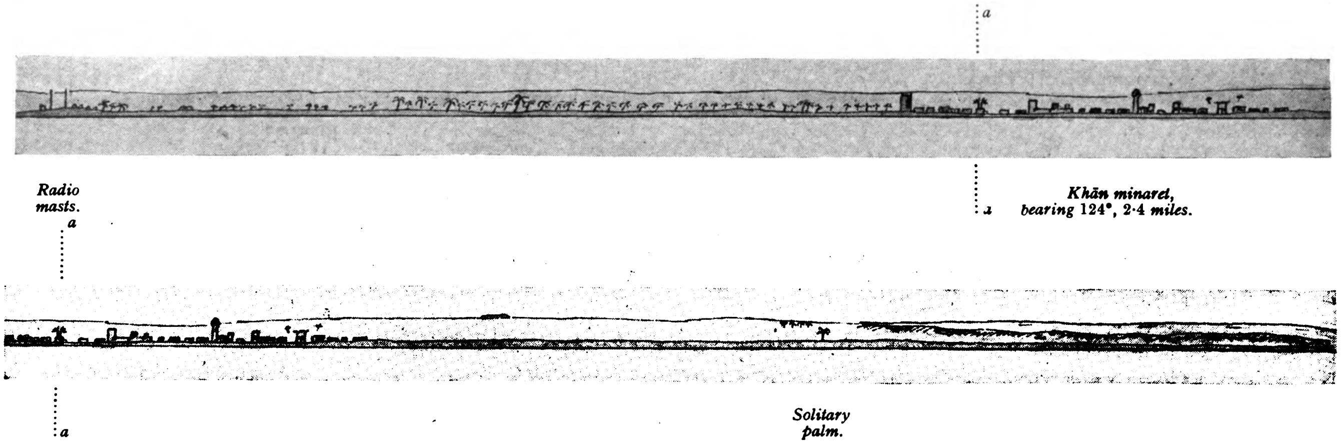
Charts 2837, 2858, 748b.

To face page 164.



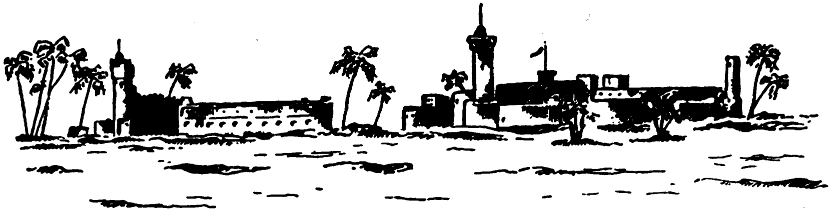
Al ʻAjman from north-westward.

(*Original dated* 1934.)

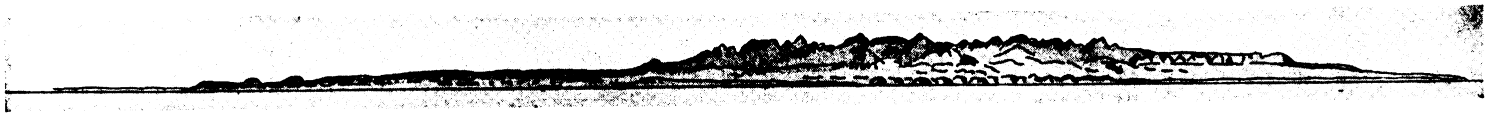


View, in two parts, of Khān from north-westward.

(*Original dated* 1933.)



Abu Dhabi Fort, bearing 114°, distant 8¾ cables.
(*Original dated* 1948.)


Sydney hill.
Qarn al Khabta.
Mt. Stewart.

Jazīrat al Yās from northward, distant about 5 miles.
(*Original dated* 1933.)

Charts 3705, plan of Abu Dhabi, 3707.

well; the reef may be rounded closely and anchorage obtained as previously directed; the afternoon is the best time for entering. There is a passage, with a depth of 12 feet ($3^{m}7$), leading to the inner anchorage from northward, but local knowledge is necessary.

Landing, when the swell is moderate, can be effected close north-eastward of the low sandy point half a mile northward of the fort; it is sheltered by the reef and the beach is fairly steep-to.

Charts 3707, 2837, 2847.

GREAT PEARL BANK.—This extensive bank, the northern limit of which is in depths of 20 fathoms ($36^{m}6$), fills the great bight in the southern part of the Persian gulf. The eastern limit of the pearl fishery is north-westward of Shārjah, and its northern boundary trends in a general westerly direction to Jazīrat Halūl (page 192), passing about 20 miles northward of Jazīrat Sir Abu Nu'air (page 166) ; from Jazīrat Halūl it trends north-westward to a position about 35 miles north-north-eastward of Ras Rākān (page 195). Most of the pearl banks known to the Arabs (*see* page 6) are situated southward and south-westward of this line.

The depths on the Great Pearl bank average from 10 to 15 fathoms ($18^{m}3$ to $27^{m}4$), but in places there are depths of from 20 to 25 fathoms ($36^{m}6$ to $45^{m}7$).

Many shallow knolls, with depths of from 3 to 9 fathoms ($5^{m}5$ to $16^{m}5$), lie on the bank, and these are the pearl banks proper. On all the pearl banks the depths are irregular, in many places changing suddenly by as much as 2 or 3 fathoms ($3^{m}7$ or $5^{m}5$). Extensive reefs, with depths of from 3 feet to 3 fathoms ($0^{m}9$ to $5^{m}5$), and in places with channels or open water inside them, lie within 45 miles of the coast ; the bottom is stony or broken coral, and they show up well, except on cloudy days or when the sun is ahead.

In places, especially about 35 miles north-westward of Jazīrat Sir Abu Nu'air (*Lat. 25° 13' N., Long. 54° 14' E.*), there are heavy overfalls, so that, the eye being the only guide, it is not safe to be under way after dark when near or within the great reefs, and a good lookout from aloft is indispensable.

Many islands, both close to the coast and far offshore, lie on the bank ; some are high, most of them have low projecting sandy points at their south-eastern ends, and many are barren. With the exception of Dalma (page 176) none has permanent inhabitants, though they are frequented by the pearl boats during the summer and by fishermen from Abu Dhabi during the winter.

Caution.—Tidal streams.—Pilotage.—Extreme care must be exercised when on the Great Pearl bank, for the tidal streams are strong and uncertain, and the bank has been incompletely surveyed. When southward of the parallel of 25¼° N. and westward of the meridian of 53¼° E., particular caution is required, for the safety of the vessel depends chiefly upon a vigilant lookout being maintained. Sounding affords little or no guide when approaching the islands and reefs. A vessel with a draught of more than 10 feet ($3^{m}0$) should not be under way after dark anywhere in the above area. *See* also on page 9.

From observations made by H.M.S. *Crocus*, in 1924, it would appear that, between Jazīrat Sir Abu Nu'air and a position midway between

Charts 2858, 748b.

Charts 3707, 2837, 2847.

that island, Jazīrat Sirri, and Jazīrat Bū Mūsa, the tidal streams set eastward and westward at a rate of about three-quarters of a knot; that between Jazīrat Sir Abu Nu'air and the meridian of 53° 10′ E. they set east-south-eastward and west-north-westward at a rate of about half a knot; and that between the meridian of 53° 10′ E. and Jazīrat Halūl they set southward and northward at a rate of about a quarter of a knot.

A vessel visiting the coast, or navigating within the reefs should have a pilot on board.

The best pilots for the coast are to be obtained at Abu Dhabi.

Chart 3452, plan of Jezirat Sir Bu Na'air.

Jazīrat Sir Abu Nu'air.—Anchorage.—Jazīrat Sir Abu Nu'air situated about 44 miles northward of Abu Dhabi, is composed chiefly of small volcanic hills, except its south-eastern extremity, which is a very low sandy point. The summit of the island is a table-topped peak which rises to an elevation of 240 feet (73^m2) near the southern end of the hills and is fairly prominent, except from northward.

The island is fringed with a reef which extends from 2 to 5 cables offshore. Two rocks, awash, lie about 4 cables off the northern end of the island. The south-eastern point (*Lat. 25° 12′ N., Long. 54° 15′ E.*), being low, must be given a good berth at night. There is a flagstaff about 1¼ cables north-north-westward of this point. The soundings are not a good guide when approaching the island.

There is iron oxide in the island and during the winter months when the mines are worked a village on the southern side of the island may have a population of 250; during the remainder of the year the island is occupied by an Arab caretaker and a guard who, with their families, live in mud and concrete huts about 6 cables northward of the flagstaff; there is a bungalow for the use of the European visiting manager about 6 cables north-westward of the flagstaff. The iron oxide is dumped on the sand north-westward of the flagstaff and is dark red in colour. There are two brackish wells inland and the island is barren except for some brushwood which supports a few goats and up in the hills are some wild cats, sea birds and curlew.

During the pearl fishery, the island is visited by numbers of boats; in winter, a few fishing boats usually make it their headquarters, and temporary huts are erected for their families.

Anchorage, sheltered from the shamāl but exposed to the nashi, may be obtained on the eastern side of the island, in a depth of about 13 fathoms (23^m8), about half a mile offshore, with the summit bearing 275°, and the low south-eastern point 202°.

In 1948, H.M.S. *Wren* obtained good anchorage, sheltered from the shamāl, in a depth of 10 fathoms (18^m3), about 3 cables offshore with the summit bearing 275°.

In 1935, H.M.S. *Bideford* obtained anchorage, sheltered from the nashi, in a depth of 4 fathoms (7^m3), about 3 cables offshore with the summit bearing about 345°.

Chart 3707.

Dangers on south-eastern part of Great Pearl bank.—Rig az Zakum, with a least depth of 15 feet (4^m6), is a pearl bank lying about 34 miles west-north-westward of Abu Dhabi; it is not marked by discoloration, and soundings give little guide when approaching it.

Southward of Rig az Zakum, between that bank, Abu Dhabi, and

Chart 2858, 748b.

Chart 3707.

Rig al Halj (page 169), the area has been imperfectly sounded. In many places there are heavy overfalls. Three shoals, lying respectively about 12 miles south-westward, 8 miles southward, and 10 miles south-south-eastward of the shoalest part of Rig az Zakum, were reported in 1927; they have not been examined and their positions are only approximately known. A shoal, with a depth of 27 feet ($8^{m}2$), lies eastward of the foregoing, about 22 miles west-north-westward of the fort of Abu Dhabi. A shoal, the position of which is approximate, was reported, in 1935, to lie about 18 miles west-north-westward of the fort.

A shoal, with a depth of 21 feet ($6^{m}4$), the position of which is approximate, was reported, in 1934, to lie about 14½ miles northward of the fort at Abu Dhabi. A shoal, with a depth of 21 feet ($6^{m}4$), the position of which is approximate, was reported, in 1926, to lie about 11 miles southward of the shoalest part of Rig az Zakum. A 5-fathom ($9^{m}1$) patch lies about 27 miles westward of the fort at Abu Dhabi.

COAST.—Dangers.—The southern shore of the Persian gulf is low and sandy or stony, with here and there hills of rock or sand of moderate height, but there are few, if any, distinctive features; it is entirely barren and desolate. From Abu Dhabi to Al Waqra (page 187), about 155 miles west-north-westward and about 60 miles south-south-eastward of Ras Rākān, there are neither villages, houses, nor permanent inhabitants. The coast is occasionally visited by Bedouin who might attack a small unarmed party; but it is seldom visited by Europeans. Reefs, on which are many low islands, lie from 10 to 30 miles off it; some of the islands are of considerable size and overgrown with mangroves. A few are inhabited seasonally.

In the eastern part of this coast there are many creeks and backwaters, and channels through and between the reefs which have been only partially examined. The land is a stony desert, with small detached groups of volcanic hills; on the coast are low cliffs. The apparent coast line, for 30 miles south-westward of Abu Dhabi (*Lat. 24° 29′ N., Long. 54° 21′ E.*), is formed by a number of low islets with creeks running in between, and meeting behind them, thus detaching them from the mainland which lies at some considerable distance within them and has not been examined. Many of the islets, and the mainland behind them, are resorted to by the Arabs and the creeks are visited by fishermen; all the creeks are reported to have shallow entrances and greater depths inside.

The tidal streams are reported to be strong in places; particularly round the points of the islands, through the narrow channels, and between the reefs.

Jazīrat al Bahrāni, on the south-western side of the entrance of the backwater southward of Abu Dhabi, is a low sandy island with some mangroves on it.

Jabal Abu Kashāsha is a small hill on the island about one mile southward of Jazīrat al Bahrāni. Ras al Kahf, about 7 miles south-westward of the south-western extremity of Jazīrat al Bahrāni, is a flat-topped rocky point, comparatively high, and probably a part of the mainland. Umm al Majārib and Jazīrat Q̣antar are low islands, 3½ and 5 miles, respectively, south-south-westward of Ras al Kahf; they are covered with mangroves and are separated from each other

Charts 2837, 2858, 748b.

Chart 3707.

and from the mainland, by small creeks. The islands mentioned above are fringed by a reef which extends about 3 miles north-westward from Jazīrat al Bahrāni and 8 miles north-westward from Jazīrat Qantar.

Khōr Qantar, a channel through the reefs, is about one mile wide at its entrance, situated about 23 miles west-south-westward of Abu Dhabi. It trends about 8 miles southward and then divides, one part extending eastward southward of Jazīrat Qantar, and the other westward southward of Jazīrat as Salāli (*see* below). There are depths of 2 fathoms ($3^{m}7$) in the entrance channel and 4 and 5 fathoms ($7^{m}3$ and $9^{m}1$) farther in.

Fasht al Bazm.—This reef, forming the northern side of Khōr al Bazm (page 169), also forms the western side of Khōr Qantar, whence it extends about 53 miles westward. The northern edge of this reef lies from 12 to 17 miles off the mainland and is only charted approximately. Soundings are no guide when approaching it for there are depths of from 5 to 10 fathoms ($9^{m}1$ to $18^{m}3$) both close to it and at a distance of 15 miles from it.

A chain of islands, usually called collectively Bazm, though each island has its own proper name, extends along the southern edge of the reef.

Jazīrat as Salāli, the easternmost island on Fasht al Bazm, is low, except near its north-eastern end where there is a hill. Westward of the island, there is a channel into Khōr al Bazm which is used by boats at high water. Jazīrat Abul al Abyadh, about 1¼ miles westward of Jazīrat as Sāleli, is the largest on Fasht al Bazm and on its western part are low sand hills. Salāhah, about 4½ miles westward of the western extremity of Jazīrat Abul al Abyadh and one mile inside the southern edge of the reef, is a rocky islet in the vicinity of which are a number of detached rocks. Junanah, a rocky islet, lies on the southern edge of the reef, about 4½ miles westward of Salāhah (*Lat. 24° 12′ N., Long. 53° 29′ E.*), with Umm Amim, a smaller islet, about 1½ miles north-north-westward of it.

Marrawah, an island 24 feet ($7^{m}3$) high at its western end, is situated about 3 miles north-westward of Junanah. It is partly covered with mangroves. There is a small village on the north-western part of the island, composed of rush huts and one stone building. Farther eastward, there are some brackish water holes. The population numbers about 80 in winter, but not all these are permanently resident.

Fiyya, 12 feet ($3^{m}7$) high, separated from Marrawah by a flat of sand and coral that dries, and lying close westward, is also inhabited, seasonally, by about 80 natives. There are a few stone houses on the north-eastern part of the island. The island is covered with scrub, except its eastern end, where there are some mangroves. A sand and coral spit extends about 3½ miles west-south-westward from Fiyya.

Hālat Hail is an islet, about 8 feet ($2^{m}4$) high, situated on the northern edge of Fasht al Bazm, about 6½ miles north-eastward of the north-eastern extremity of Marrawah. A shoal, with a depth of 13 feet ($4^{m}0$), lies about one mile north-eastward of Hālat Hail.

Chart 3765.

Bazm al Gharbi lies about 4½ miles west-north-westward of Fiyya and is the westernmost island on Fasht al Bazm. It is 8 feet ($2^{m}4$)

Charts 2837, 2858, 748b.

Chart 3765.

high, sandy and covered with scrub; it has some mangroves along its eastern shore, and is uninhabited.

Marrawah, Fiyya and Bazm al Gharbi are all fringed along their southern sides with reefs extending from 2 to 5 cables offshore, making landing difficult.

Fasht al Bazm extends about 1½ miles south-eastward and 2½ miles north-westward of Bazm al Gharbi.

Reedeim, the north-western part of Fasht al Bazm, is probably detached and lies about 6 miles northward of Bazm al Gharbi.

Chart 3707.

Rig al Halj and Bu Tini.—These two extensive shoals lie in the approach to Khōr al Bazm, northward of the western half of Fasht al Bazm. Rig al Halj has not been surveyed, but there are a few sand banks on it, which dry. Hālat al Mubarras is a sandy islet, about 3 feet ($0^{m}9$) high, lying on the southern edge of Rig al Halj, about 4 miles north-westward of Hālat Hail.

Khōr Bashūbar, the channel between Rig al Halj and Fasht al Bazm, is about 1½ miles wide with depths of from 4 to 8 fathoms ($7^{m}3$ to $14^{m}6$) in the fairway.

The tidal streams, setting eastward and westward through Khōr Bashūbar, are strong at springs.

Charts 3765, 3707.

Bu Tini, about 9 miles west-north-westward of Rig al Halj, is an extensive shoal on which lie an islet about 3 feet ($0^{m}9$) high, and several sand banks which dry. On this, and on many other shoals on the Great Pearl bank, the fishermen wade about, searching for pearl oysters, far from their boats.

Khōr Halj is the clear channel between Bu Tini, north-westward and northward, and Rig al Halj and Reedeim, south-eastward and southward; it appears to have a least width of about 5 miles, with depths of from 5 to 12 fathoms ($9^{m}1$ to $21^{m}9$) in the fairway.

Chart 3707.

Directions.—Khōr Halj is navigable by day in clear weather. The dry banks on Bu Tini can be seen from aloft from some distance from the shoal and Bazm al Gharbi is visible from aloft when in mid-channel.

To pass eastward through Khōr Halj, a vessel should keep on the Bu Tini side, with the sand banks of that shoal in sight until she has passed it; a good lookout should be kept for the pale green water on Rig al Halj. To pass through Khōr Bashūbar, a vessel should steer eastward from a position southward of Bu Tini with caution until Rig al Halj is sighted; she should then proceed along its southern edge passing about 2½ cables southward of Hālat al Mubarras (*Lat. 24° 28′ N., Long. 53° 22′ E.*).

These passages should only be used with the sun astern.

Khōr al Bazm.—Khōr al Bazm is a blind channel, except for boats (*see* page 168), leading between Fasht al Bazm and the mainland for about 45 miles. At its entrance its width is about 3½ miles which decreases to about one mile at its head.

It is best approached from the direction of Jazīrat al Yās, northwards of Jazīrat Yabr and Jazīrat Ish, but can also be entered from north-westwards of Reedheim; this latter channel has not been surveyed.

Charts 2837, 2858, 748b.

Chart 3707.

Coast.—Ras al Aish is a low-lying rocky point fringed by coral reefs, about 9 miles south-south-eastward of Bazm al Gharbi. It is backed by Hadwaniya, a range of stony flat-topped hills, 125 feet (38^{m}1) high. Jabal Gharain is a conspicuous conical hill 114 feet (34^{m}3) high, which shows white against the darker background of Hadwaniya. It is prominent when bearing more than 160°.

A chain of low-lying, scrub-covered islands, coral reefs and drying sands extend from Ras al Aish to a point 5 miles north-westward of Jazīrat al Hamar, 20 miles westward of Ras al Aish. Of these islands, Bu Shirayah and Dagallah are inhabited by a few Arabs during the winter months; they are mainly engaged in fishing. Thimariyah, 7 miles westward of Ras al Aish is mostly low-flying, but rises to a cliffy headland at its north-western end, 49 feet (14^{m}9) high. The coast lies from 1½ to 2½ miles southwards of these islands and reefs, and is generally low and sandy with the exception of Ras al Jala'a. a promontory with cliffs 90 feet (27^{m}4) high, which is conspicuous. Ras al Jala'a is fringed by a coral reef extending 3½ cables offshore.

An area of shallow water is enclosed between these islands and the coast, and only boats of shallow draught can enter.

The hinterland is desert; it is characterised by ranges of stony, rugged and generally flat-topped hills running south-eastward, separated from one another by large areas of flat sand which flood at exceptionally high tides. The highest of these hills are flat-topped "buttes" of which the most prominent are Kihal 136 feet (41^{m}5) high (*Lat. 24° 07' N., Long. 53° 01' E.*), Manaiyif 183 feet (55^{m}8) high (*Lat. 24° 06' N., Long. 52° 56' E.*), the hills southward of Ras al Jala'a 112 feet (34^{m}1) high, and Ruweis 125 feet (38^{m}1) high (*Lat. 24° 05' N., Long. 52° 44' E.*).

The coast from southwards of Jazīrat al Hamar westward, is generally low-lying and sandy with a few small stony hills rising to an elevation of about 30 feet (9^{m}1). It is fringed by a coral reef extending from 2 to 5 cables offshore with a few breaks, and backed by a large area of sand flats which flood and partly cover at high water.

Charts 3765, 3707.

Jabal Dhanna, a conspicuous peak 384 feet (116^{m}4) high, of volcanic origin, and surrounded by numerous smaller peaks interspersed with ravines, lies about 5½ miles southward of Jazīrat al Yās. There are two small but prominent "buttes" 2¾ miles south-eastward and 1¾ miles eastward of Jabal Dhanna, 91 feet (27^{m}7) and 75 feet (22^{m}9) high, respectively.

Off-lying Islets.—Dangers.—From Jazīrat Ghasha (*see* page 172), a complex bank with deep channels, coral reefs, and drying sandbanks extends about 18 miles east-south-eastward. A number of low-lying islands are situated on this bank.

Umm Kirkum, a sandy islet 3 feet (0^{m}9) high, lies 6 miles east-south-eastward of Jazīrat Ghasha.

Umm Qasar, 11 feet high (3^{m}4), is separated from Umm Kirkum by a narrow channel.

Hook islet, a very small sandy islet, 9 feet (2^{m}7) high, lies 1¾ miles south-westward of Umm Qasar.

Fata'ir is a small ridge of sand 3 feet (0^{m}9) high, situated on a coral reef 5 miles eastward of Hook islet. There are two small sandbanks,

Charts 2837, 2858, 743b.

Charts 3765, 3707.

which dry 5 feet ($1^{m}5$), about one mile westward and south-westward, respectively, of Fata'ir.

Jazīrat 'Ish is an islet 9 feet ($2^{m}7$) high, about 3½ miles south-south-eastward of Fata'ir. It is situated at the southern end of a fairly extensive coral reef; this reef has a small lagoon with depths of 7 fathoms ($12^{m}8$) at its northern end.

Niwat al Boom, consisting of two coral heads, each with a depth of one foot ($0^{m}3$) over it, lies about 4 miles south-south-eastward of Hook islet.

Coral heads and reefs with depths of less than 18 feet ($5^{m}5$), extend southward of Niwat al Boom and south-eastward from Jazīrat 'Ish as far as Dagallah. Numerous shoals extend northward and westward from Ras al Aish in the entrance to the Khōr al Bazm.

Samman is a sandy spit and off-lying sandbank with a depth of 7 feet ($2^{m}1$) over its outer end, extending nearly 3½ miles west-south-westward from Bazm al Gharbi.

Directions.—Anchorage.—A vessel proceeding to Khōr al Bazm should follow the directions for Jazīrat al Yās anchorage (*see* page 173) until Jazīrat Yabr bears 133°, distant 5¼ miles. She should then steer 100° until Jazīrat Yabr bears 171°, distant 2·9 miles, and then alter course to 126° keeping to the recommended track. The least depth on this track is 27 feet ($8^{m}2$), 2¼ miles northwards of Jazīrat Yabr. Thence she should alter course to 077° with Jazīrat Yabr, bearing 257°, astern, and alter course to 100° when Hook islet bears on 280° astern, and to 126° when Fata'ir bears 306°. The vessel can proceed on an easterly course for Khōr al Bazm when the northern extremity of Jazīrat 'Ish bears 270°. When the south-eastern end of Bazm al Gharbi bears about 069°, it should be approached on that bearing and anchorage, completely sheltered by the reef, can be obtained about one mile offshore, in a depth of 5 fathoms ($9^{m}1$), clay and good holding ground.

Khōr al Bazm may also be approached from the northwards, passing westwards of Reedeim. The northern part of this channel has not been surveyed.

The passage into Khōr al Bazm from either direction should not be attempted in conditions of poor visibility, as the low-lying islands are difficult to see, and the tidal streams run strongly in the channels and are unpredictable in rate and direction.

In proceeding up Khōr al Bazm, from southward of Bazm al Gharbi the depths appear to be more regular than in the approach, and the vessel should pass from about one to 2 miles southward of the islands on Fasht al Bazm, being guided by the eye when approaching the edge of the reef. Junanah, which is rocky, may be passed close-to.

Chart 3765, plan of Jezirat Yas.

Jazīrat al Yās, and off-lying islets and dangers.—Jazīrat al Yās, lies with Ras al Khuzairi (*Lat. 24° 16′ N., Long. 52° 36′ E.*), its southern extremity, a low sandy point, about 5½ miles northward of Jabal Dhanna; it rises in the middle to volcanic hills, nearly 500 feet ($152^{m}4$) high. The most conspicuous summit is Qarn al Khabta, 484 feet ($147^{m}5$) high and conical, situated on the south-eastern fringe of the hills and lighter in colour than the remainder; on its summit is a cairn, 5 feet ($1^{m}5$) high. Mount Stewart (*Lat. 24° 19′ N., Long.*

Charts 2837, 2858, 748b.

Chart 3765, plan of Jezirat Yas.

52° 36′ E.), 483 feet (147^{m}2) high and black in colour, lies about 2 cables west-south-westward of Qarn al Khabta and is also surmounted by a small cairn; Sydney hill, 443 feet (135^{m}0) high, lies about a mile northward of Mount Stewart, and, being slightly detached, is prominent from westward. *See* views facing pages 165 and 180.

Stokes bluff, the eastern extremity of the island, is 71 feet (21^{m}6) high, but the coast on either side of the bluff is low; there are cliffs, from 7 to 48 feet (2^{m}1 to 14^{m}6) high, round the northern and western sides of the island. From the southern limit of the hills the ground slopes down to a low sandy plain, covered with coarse scrub, for about 2 miles to Ras al Khuzairi.

There are two small villages on the island: Dhahar on the northern coast and 'Awāfi on the western; Dhahar appears to be permanently inhabited and contains a few mud houses; the dhows belonging to the villagers are moored on the reef fringing that part of the coast. 'Awāfi, consisting of rush huts and tents, is inhabited during the winter months only. There is a small inlet in the fringing reef near 'Awāfi, with a least depth of one foot (0^{m}3), known as Khōr al Bab and which provides shelter for a few small dhows; it is marked by a small beacon 5 feet (1^{m}5) high.

Duwaisir is a small lagoon, situated at the south-eastern end of the island and provides excellent shelter for small craft; the entrance which is about half a cable wide, has a depth of one foot (0^{m}3) but inside there are depths of from 24 to 36 feet (7^{m}3 to 11^{m}0).

With the exception of Ras al Buwaitir, the south-eastern extremity, the island is surrounded by a fringing reef extending from about one to 6 cables from the eastern side and for from 4 to 11 cables from the northern and western sides.

Jazīrat Ghasha, a flat, low, rocky islet, covered with coarse shrub, lies about 3½ miles north-north-eastward of the northern extremity of Jazīrat al Yās, and on the western end of the shoals extending northward and westward from Jazīrat 'Ish. These shoals, several of which dry in the form of low sandy islets, have not been closely surveyed and it is extremely doubtful whether there is any navigable passage through them.

There is a cairn, 24 feet (7^{m}5) high, near the western extremity of Jazīrat Ghasha, and is a useful mark when approaching Jazīrat al Yās anchorage.

Niwat Ghasha, with a least depth of 24 feet (7^{m}3), lies about 2¼ miles north-westward of the cairn on Jazīrat Ghasha (*Lat. 24° 25′ N., Long. 52° 39′ E.*). There are usually overfalls over this shoal.

The Ridge, with a least depth of 18 feet (5^{m}5), and steep-to, is a rocky spit extending about 1½ miles south-westward from Jazīrat Ghasha; there are usually overfalls on the spit. A shoal, with a depth of 24 feet (7^{m}3), lies nearly 1½ miles west-south-westward of the cairn on Jazīrat Ghasha.

Bu San'a, with a least known depth of 16 feet (4^{m}9), but possibly less, lies about 2 miles northward of Jazīrat al Yās; it is separated from the reef which fringes the northern side of this island by a channel about three-quarters of a mile wide, with a least known depth of 27 feet (8^{m}2) in the fairway; this channel, however, has not been closely sounded and is not recommended.

Parks shoal, with a depth of 26 feet (7^{m}9), lies 2¾ miles north-

Charts 3707, 2837, 2858, 748b.

Chart 3765, plan of Jazirat Yas.

westward of the north-western extremity of Jazīrat al Yās; except on its eastern side the shoal is fairly steep-to.

'Ayayat Ghasha, part of which dries, is a coral reef lying about one mile south-south-eastward of Jazīrat Ghasha; a narrow channel, not closely sounded, separates it from the reef fringing that island. Low sandy islets lie about 6 miles eastward and east-south-eastward of 'Ayayat Ghasha.

A sand bank, which nearly dries, lies on the outer edge of the shoal bank, which extends about a mile from the north-eastern side of Jazīrat al Yās. A shoal bank, with a depth of 11 feet ($3^{m}4$) at its outer edge, extends about a mile from the middle of the eastern side of the same island. Rig bu Aitr, with a depth of 10 feet ($3^{m}0$), lies 1½ miles east-south-eastward of Stokes bluff; there is a 16-foot ($4^{m}9$) patch about one mile east-south-eastward, and some rocks, nearly awash, about 11 cables south-eastward of the bluff. A detached shoal, with a depth of 10 feet ($3^{m}0$), lies about 1¼ miles southward of the bluff.

Jazīrat Yabr, sandy, 3 feet ($0^{m}9$) high, and steep-to on its southern side, lies on the southern edge of a reef which extends about 1¼ miles northward from the islet, which is situated about 4 miles eastward of Stokes bluff; a cairn stands on the islet.

Price shoal, with a depth of 4 feet ($1^{m}2$), lies about 1¾ miles south-south-westward of Jazīrat Yabr. Two patches, with depths of 11 and 12 feet ($3^{m}4$ and $3^{m}7$), lie about 5 cables northward and 3½ cables north-westward, respectively, of the shoalest part of Price shoal.

Hālat al 'Alaq, a sandy islet 2 feet ($0^{m}6$) high, lies about 3¾ miles south-eastward of Ras al Buwaitir; a reef extends about 2 cables from its northern and eastern sides, but it is steep-to on its south-western side.

A bank, with depths of less than 6 feet ($1^{m}8$), extends about one mile south-south-eastward from Ras al Khuzairi. Long reef, on which there are numerous coral heads, lies about midway between Ras al Buwaitir and the point on the mainland 1½ miles northward of Jabal Dhanna (*Lat. 24° 10′ N., Long. 52° 36′ E.*).

Anchorages.—Directions.—Good anchorage may be obtained about 4 cables from the reef fringing Jazīrat al Yās either in a depth of 8 fathoms ($14^{m}6$), grey clay, with Stokes bluff bearing 008° and Ras al Buwaitir, 255°; or, in 9 fathoms ($16^{m}5$), mud and sand, with Qarn al Khabta in line with Ras al Buwaitir, bearing 339° and Ras al Khuzairi, 259°.

Chart 3765.

A vessel should approach these anchorages from northward of Jazīrat al Yās with Qarn al Khabta bearing 175°.

Chart 3765, plan of Jezirat Yas.

When the cairn on Jazīrat Ghasha bears 147° she should steer for it on that bearing until the western edge of the cliffs close eastward of Dhahar village is in line with the 247-foot ($75^{m}3$) hill, situated about 3½ cables north-eastward of Qarn al Khabta, bearing 191° (*see* view facing page 180), when she should keep these marks in line. As the hill may not be clearly distinguished until the transit is nearly reached, the bearing of Qarn al Khabta should be checked. This course leads between Niwat Ghasha and Jazīrat Ghasha and, subsequently, between Bu San'a and the Ridge, the last named being cleared when the cairn on Jazīrat Ghasha bears 049°.

Charts 3707, 2837, 2858, 748b.

Chart 3765, plan of Jezirat Yas.

The vessel should then steer for Jazīrat Yabr, bearing 133°, and when Qarn al Khabta, which is conspicuos from eastward, bears 244°, she should steer about 175° until the same hill bears 285°, when she should alter course south-westward and steer with Jazīrat Yabr, bearing about 053°, astern.

Ras al Khuzairi, bearing about 244° and open southward of Ras al Buwaitir, just clears the shoal depths southward of Rig bu Aitr, but the anchorage is best approached with the former point bearing 259°.

The channel described above has a depth of not less than 30 feet ($9^{m}1$), its shoalest part being between Niwat Ghasha and Jazīrat Ghasha.

Vessels with a draught of more than 15 feet ($4^{m}6$) should not attempt the entrance with a visibility of less than 8 miles.

If proceeding to Duwaisir the vessel should close Ras al Buwaitir until the entrance is reached, when she should turn into the bay keeping between the shoals on either hand which can easily be seen.

Chart 3765.

OUTLYING ISLANDS AND DANGERS.—Jazīrat az Zarqa.—Anchorage.—Jazīrat az Zarqa, about 39 miles north-eastward of Jazīrat al Yās, rises to a fairly prominent peak, 525 feet ($160^{m}0$) high, and is bare except for stunted brushwood on its southern part. The island is frequented by many sea birds in the breeding season. The low southern part of the island is fringed by a reef and a sand spit, which affords good landing on its eastern side, extends from the southern extremity.

Shoal patches, with less than 18 feet ($5^{m}5$) over them, extends about 2¾ miles southward from the island; shoals with depths of 6 fathoms ($11^{m}0$), or less, over them, extend southward to Bu Tini (page 169).

Anchorage may be obtained, in a depth of 5½ fathoms ($10^{m}1$), with the southern extremity of the island bearing 300°, distant 12 cables; the anchorage is fairly sheltered from the shamāl, but some swell rolls in round the island.

The tidal streams in the vicinity of the island are variable and are strongest at neaps, causing ripplings like breakers at the southern end of the island.

Jazīrat al Qarnain.—This island lies about 11 miles west-north-westward of Jazīrat az Zarqa (*Lat. 24° 53′ N., Long. 53° 04′ E.*). The southern part of the island is low, but at its northern end are three remarkable, detached peaks, the highest of which has an elevation of 190 feet ($57^{m}9$).

The island is too small to afford any protection from the shamāl. The best landing is on a sandy beach on the western side of its southern extremity, the remainder of the island being fringed by a reef.

A spit, with depths of from 11 to 30 feet ($3^{m}4$ to $9^{m}1$), extends about 3 miles southward from the southern extremity of the island.

Chart 3707.

Jazīrat Dās.—Anchorage.—This island, about 12 miles northward of Jazīrat al Qarnain, rises in its northern part to an elevation of 154 feet ($46^{m}9$), its southern part being low. A reef fringes the southern part of the island and a spit, with depths of from 18 to 33 feet ($5^{m}5$ to $10^{m}1$) over it, extends about 2½ miles southward from the southern extremity.

Charts 2837, 2858, 748b.

Chart 3707.

Anchorage may be obtained, in depths of 8 fathoms ($14^{m}6$), about 8 cables south-eastward of the low sandy southern extremity of the island, but during a shamāl much swell would probably be felt there for the island affords but little shelter. Caution is necessary when approaching this anchorage for the depths rapidly decrease.

The best landing place is on the western side of the south-eastern point of the island. There is another landing place, sheltered from winds westward of north, about 3½ cables southward of the north-eastern extremity of the island.

Chart 3765.

Jazīrat ‘Ardhana.—Anchorage.—Jazīrat ‘Ardhana, about 25 miles northward of Jazīrat al Yās, is 215 feet ($65^{m}5$) high near its northern end, but its southern part is a plain. It is fringed by a reef except at its southern extremity, which terminates in a sandy spit, on the eastern side of which is the best landing.

Shoals with depths of from 9 feet to 18 feet ($2^{m}7$ to $5^{m}5$) lie within 4 miles north-eastward, 2½ miles eastward and 3 miles southward of the island. This shoal area prevents any but shallow draught vessels closing the island from south-eastward, but it breaks the force of the shamāl and fairly comfortable anchorage may be obtained in a depth of 7½ fathoms ($13^{m}7$), sand, with the summit of the island bearing 319° distant about 3¼ miles. The island should be approached with caution, however, as the depths decrease abruptly from 36 to 9 feet ($11^{m}0$ to $2^{m}7$), and the shoals are not easily seen, even in calm weather.

A shoal, with a depth of 24 feet ($7^{m}3$), lies 6½ miles eastward of the island. Three small patches, with a least depth of 15 feet ($4^{m}6$), lie from 2½ to 3½ miles northward of the island.

Depths of less than 36 feet ($11^{m}0$) lie southward and eastward of the main shoal area described above.

Creagh shoal, a typical atoll formation with a least depth of 25 feet ($7^{m}6$), lies about 10 miles south-eastward of Jazīrat ‘Ardhana (*Lat. 24° 47′ N., Long. 52° 34′ E.*).

Directions.—A vessel approaching Jazīrat al Yas from northward should pass about midway between Jazīrat az Zarqa and Jazīrat al Qarnain on a southerly course until the summit of Jazīrat az Zarqa bears 063°, when she should steer with this island, astern, on that bearing, passing north-westward of Creagh shoal; the summit of Jazīrat Dalma (page 176) should be subsequently sighted right ahead if the weather is clear. When Jazīrat ‘Ardhāna bears 355°, she should alter course southward and keep it astern on that bearing, and Qarn al Khabta will be sighted right ahead; thence if proceeding to the anchorage off the south-eastern side of Jazīrat al Yās she should follow the directions given on page 173.

Jazīrat Diyina.—Anchorage.—Jazīrat Diyina, situated about 12 miles north-westward of Jazīrat ‘Ardhāna, is flat and sandy and sparsely covered with scrub. The highest part is a detached black rock at its northern end, 12 feet ($3^{m}6$) high. The northern part of the island is fringed by a reef, extending as much as 4 cables offshore.

Anchorage may be obtained, in a depth of 5½ fathoms ($10^{m}1$), about 9 cables south-south-eastward of the southern extremity of the island; it is more sheltered from the shamāl than might be expected from the small size of the island.

Charts 2837, 2858, 748b.

Charts 3765, 3707.

Two rocks, with depths, respectively, of 2 feet and 10 feet ($0^{m}6$ and $3^{m}0$), lie about three-quarters of a mile north-westward and north-north-westward of the detached black rock.

Two 18-foot ($5^{m}5$) patches lie, respectively, 8¾ miles northward and 4½ miles eastward of the island.

An extensive and irregular shoal, with depths of less than 36 feet ($11^{m}0$), lies from 17 miles north-westward to 15 miles eastward of Jazīrat Diyina joining the 18-foot ($5^{m}5$) bank north-eastwards of Jazīrat 'Ardhāna.

Tidal streams.—The tidal streams are strong and unpredictable. They run mainly in north-easterly and south-westerly directions, but are much diverted in the vicinity of the islands, attaining a rate of over one knot at springs.

Chart 3707.

Jazīrat Shurā'awa.—Anchorage.—This islet, situated about 19 miles west-north-westward of Jazīrat Diyina, is 40 feet ($12^{m}2$) high, and has a number of small hummocks on it, which lie in an easterly and westerly direction; the middle of the islet is low. There is little or no fringing reef, but depths of 18 feet ($5^{m}5$) extend about half a mile northward and southward from the islet. There is a good sandy beach on which turtles may be caught.

A detached rocky pinnacle, with a depth of less than 6 feet ($1^{m}8$) over it, lies about one mile northward of the islet.

The depths between Jazīrat Diyina (*Lat. 24° 57′ N., Long. 52° 23′ E.*) and Jazīrat Shurā'awa are very irregular, and several reefs were reported, in 1911, by H.M.S. *Philomel* to lie between these islands; the depths in the approach from southward are also irregular. The least depth in the approach from northward, with the islet bearing between 180° and 190°, appears to be 5 fathoms ($9^{m}1$), but there may be reefs in this area. A one-fathom patch lies on the southern side of Qarn al 'Ashairiq, an extensive pearl bank about 5¼ miles north-westward of Jazīrat Shurā'awa. A coral shoal, with a depth of 30 feet ($9^{m}1$) over it, lies about 2½ miles northward of the island.

Fair anchorage can be obtained during a shamāl, about 3 cables offshore on the southern side of the islet, in depths of 5 or 6 fathoms ($9^{m}1$ or $11^{m}0$), sand; a vessel about 200 feet ($61^{m}0$) in length would swing into a depth of 4 fathoms ($7^{m}3$); there is no shelter farther out.

Chart 3452, plan of Jezirat Dalmah.

Jazīrat Dalma.—Anchorage.—Off-lying shoals.—Jazīrat Dalma lies about 15 miles north-westward of Jazīrat al Yās. Its northern part consists of a series of low hills, which from a distance appear as a tableland. The highest of these lies near the northern end and is 305 feet ($93^{m}0$) high. The southern part is low and sandy, and draws away to a long sand spit. A village, with about 60 inhabitants in 1953, is situated on the south-western side. It has a tower and several stone buildings, and was once a centre of the pearling industry but this has now declined. *See* view facing page 157.

Except off the sand spit at the southern end, the island is fringed with a reef extending from 2 to 4 cables offshore. An easy boat landing can be made on either side of the sand spit.

A good anchorage, with shelter from the shamāl, can be obtained in a depth of about 9 fathoms ($16^{m}5$), with the southern tip of the

Charts 2837, 2858, 748b.

Chart 3452, plan of Jezirat Dalmah.

island bearing 245°, distant 11 cables. Small vessels can anchor off the village on the western side.

Hālat Masuma, a reef that dries, and on which lie some shifting sand cays, lies about 1½ miles to the southward. There is a boat passage between it and Jazīrat Dalma (*Lat. 24° 30′ N., Long. 52° 19′ E.*). Drinkel shoal, with depths of from 11 to 13 feet ($3^{m}4$ to $4^{m}0$) lies within 6½ miles south-westward of Hālat Masuma.

There are numerous shoals in the vicinity of Jazīrat Dalma. Soundings give little or no indication of dangers. Under good conditions of light and sea, shoals with depths of less than 5 fathoms ($9^{m}1$), normally show up, but this cannot be relied on.

Chart 3707.

Haslam patches extend about 9 miles south-south-eastward of Jazīrat Dalma, nearly meeting a series of shoals extending north-north-westward from Jazīrat Zabut. There is a channel about 1½ miles wide between the extremity of Haslam patches and Dalrymple rock (*see* below).

COAST.—From Jabal Dhanna (page 170) the coast trends about 18 miles west-south-westward to Jabal Barāka, and is fringed by reefs which extend up to 1½ miles offshore. The shore is sandy and low-lying and is covered by hummocks and desert grass. A group of hills, the highest of which rises to an elevation of 170 feet ($51^{m}8$), lies about 6 miles west-south-westward of Jabal Dhanna.

Jazīrat Mashat is an island connected with the mainland by a sand spit that dries. Steep-sided flat-topped hills on the island rise to elevations of from 150 to 163 feet ($45^{m}7$ to $49^{m}7$). Jazīrat Zabut is a remarkable small island 136 feet ($41^{m}5$) high, shaped like a boot with the toe pointing northward. There is a stone cairn on its highest point. Both these islands are fringed by coral reefs that dry, and landing is difficult except at high water. They are uninhabited.

Hālat Idai lies about 4 miles northward of Jazīrat Zabut and consists of a patch of sand, that dries, on a coral reef. Shoals extend northward and north-north-westward from here, terminating in Beckford shoal about 6½ miles northward and Dalrymple rock about 5 miles north-north-westward. The least depth over Beckford shoal is 9 feet ($2^{m}7$).

Jabal Barāka (*Lat. 24° 00′ N., Long. 52° 20′ E.*) rises to an elevation of 210 feet ($64^{m}0$) and is composed of reddish sandstone, but blown sand covers all but the steepest slopes. On the seaward side it rises steeply from cliffs about 20 feet ($6^{m}1$) high. Jabal Wutaid lies about 5 miles south-south-westward of Jabal Barāka and rises to an elevation of about 147 feet ($44^{m}8$). It is the most westerly of a low range of coastal hills which extends from Ras al ‘Aish (page 170).

A number of detached shoals lie within 8 miles north-north-eastward, northward and north-north-westward of Jazīrat Zabut.

Webb rock, with a depth of less than 6 feet ($1^{m}8$) over it, lies about 6½ miles north-westward of Jabal Barāka. Soundings give no indication of its proximity, nor can it be seen even in good conditions except at very close range, whence the dark brown coral can be distinguished. There is no sand on it to give the usual warning of lighter-coloured water, and it should therefore be given a wide berth.

The district of Sabkha Matti extends from Jabal Wutaid to Ras

Charts 2837, 2858, 748b.

as Sila', about 28 miles west-north-westward. It is mostly desolate, low, and partly swampy. For about 6 miles from Jabal Barāka the coast trends west-south-westward and is fringed by a reef which extending as much as half a mile offshore; beyond this point the coast is imperfectly surveyed and foul ground is reported to extend from 4 to 6 miles offshore. A detached 18 foot (5^m5) patch lies about 4½ miles offshore, 14 miles west-north-westward of Ras Assāk, situated 6½ miles west-south-westward of Jabal Barāka. The mainland is invisible from the edge of the foul ground. The Arabs state that it is the hottest part of the gulf. Foul ground extends about 2½ miles eastward from Ras al Sila'.

For about 13 miles northward of Ras as Sila', as far as Ras Sarab (*Lat. 24° 16′ N., Long. 51° 47′ E.*), the coast consists of a succession of small rocky points; the land rises gradually to a level tableland, about 100 feet (30^m5) high, falling to the coast in a series of small terraces or steps. This tableland is of light colour and sometimes sparkles in the sunlight owing to the fragments of crystals embedded in its surface. Kassār al Baya is an islet on the coastal reef about 4 miles northward of Ras as Sila'. At Ras Sarab, about 9 miles farther northward, there is a small and remarkable table hill, 75 feet (22^m9) high, thence for one mile north-westward the coast consists of low, white cliffs, whence it falls towards Ras Mashairif, a very low, rocky and shelving point, 1¾ miles farther north-westward. Between the 75-foot (22^m9) hill and Ras Mashairif (*Lat. 24° 18′ N., Long. 51° 44′ E.*) the coast is fringed by a reef, which extends from 5 to 8 cables offshore. A 9-foot (2^m7) patch, lies about one mile south-eastward of Kassār al Baya.

Off-lying islands and dangers.—Anchorage.—Jazair al Yāsāt, about 15 miles east-south-eastward of Ras Mashairif, consists of three level islands, about 15 feet (4^m6) high and bordered by cliffs; two islets and a sand bank, that dries, lie close southward of them. A 20-foot (6^m1) patch, lies about 7 cables south-eastward of the sand bank, and a shoal patch lies about one mile north-westward of it.

There is a clear channel southward of the sand bank that dries, about 2½ miles wide, but the depths are irregular and vary from 4 to 11 fathoms (7^m3 to 20^m1). A reef extends about 4½ miles northward and 5½ miles north-eastward from the northern island of the group, and thence a chain of extensive reefs continues about 60 miles northward with no known ship channel through it, except that between Fasht al 'Odaid and Rig Kareinein, which is described on page 183.

Anchorage may be obtained south-westward of Jazair al Yāsāt, with the southern islet bearing between 068° and 090°, distant about half a mile.

Westward and north-westward of Jazair al Yāsāt, along the coast and inshore of the extensive outlying reefs as far as Khōr al 'Odaid (page 181), the survey is more complete than that eastward of those islands; but it is probable that many undiscovered rocks and shoal patches exist there.

Mahamaliya, about 6 miles south-westward of the southernmost islet of Jazair al Yāsāt, is a light-coloured islet, about 36 feet (11^m0) high, which has a flat top with a notch in it, and is bordered by cliffs. A small detached patch, with a depth of 6 feet (1^m2) over it, lies about

Chart 3707.

one mile south-eastward, and a 14-foot (4^{m}3) patch, lies about 3 miles northward of Mahamaliya.

Umm al Hatab, about 6 miles north-north-westward of Mahamaliya, is about 7 feet (2^{m}1) high; its southern coast is sandy, the remaining coasts are of sandstone and limestone rock. This islet lies on a reef, with several above-water rocks off its northern end; the reef extends about a cable from the eastern and western sides of the islet, but the southern side is clear. Rig Musfair lies about 3¼ miles north-north-eastward of Umm al Hatab.

Naita, an islet about 8 feet (2^{m}4) high, lies about 2½ miles eastward of Ras Mashairif, and is chiefly sandstone; on it are some tufts of coarse grass, and a few graves; several detached rocks lie off its northern end. The islet lies on the south-western edge of Had at Tair, an extensive reef which appears to be joined to that which extends northward from Jazair al Yāsāt. A spit extends about one mile south-eastward from Naita.

In the area southward of Naita and westward of Jazair al Yāsāt, the depths are irregular, and in places where they do not exceed 3 or 4 fathoms (5^{m}5 or 7^{m}3) there are overfalls; in the deeper parts the bottom is mud, but the shoaler patches are of rock or sand.

Bab al Naita.—Tidal streams.—Bab al Naita is about 6 cables wide between the reef on which Naita lies and that which fringes the coast south-eastward of Ras Mahairif. The least depth in the fairway is about 4 fathoms (7^{m}3), and it is the only known navigable passage leading northward inshore of the extensive reefs already mentioned. The greatest depth is on the Naita side of the strait, and when passing that islet caution must be exercised, for a spit extends from the mainland nearly half-way across the channel; after passing Naita the strait widens. Foul ground extends about one mile north-westward from Ras Mashairif (*Lat. 24° 18′ N., Long. 51° 44′ E.*) and about 1½ miles in the same direction from Naita; a detached patch, with a depth of less than 6 feet (1^{m}8) over it, lies about 3¼ miles north-westward, and a 14-foot (4^{m}3) shoal lies about 4½ miles west-north-westward of the islet.

The tidal streams in the strait are strong and set north-westward and south-eastward, but the times of their turning are not known.

Coast.—Immediately westward of Ras Mashairif is the entrance to Dōhat an Nakhala; between the reefs extending from either side of this inlet the fairway, with depths of from 12 to 30 feet (3^{m}7 to 9^{m}1), is about half a mile wide, but two shoal patches in its entrance render it unsuitable for shipping.

Immediately westward of this inlet is Dōhat al Kawaisāt, the entrance to which is reported to be only 40 yards (36^{m}6) wide between the reefs on either side, with a depth of 18 feet (5^{m}5). The narrowest part of the entrance is between the western shore and Al Fazāya; the latter is an islet bordered by cliffs, and at its northern end there is a plateau about 50 feet (15^{m}2) high; it is light in colour as is the coast in the vicinity, and is connected by a shoal with the point separating the two inlets.

Ras al Hazra, about 10 miles west-north-westward of Ras Mashairif, is very low, rocky, and shelving. Several rocky islets lie on the reef which extends about half a mile offshore between the entrance of Dōhat al Kawaisāt and Ras al Hazra. A shoal was reported, in 1935,

Charts 2837, 2858, 748b.

Chart 3707

to lie about 3¾ miles south-eastward of Ras al Hazra and 2 miles offshore.

Off-lying islets and dangers.—Two islets, named Faraijdat, lie about 2 miles apart northward and southward of each other, on the south-western extremity of the great chain of reefs extending northward and north-westward from Jazair al Yāsāt. These islets are about 20 feet ($6^{m}1$) high, table-topped and light in colour. The southern islet is situated about 6 miles eastward of Ras al Hazra (*Lat. 24° 23′ N., Long. 51° 35′ E.*).

Jazair Mahayimat, situated between 4½ and 6½ miles northward of the northern islet of Faraijdat, are three very low islets lying northward and southward of each other on the reef extending northward from Faraijdat. The area for more than 15 miles eastward of Jazair Mahayimat, is reported to be encumbered with shoals with no passages between them, but it has not been examined.

Jazīrat Gaffai, about 13 miles north-north-eastward of Ras al Hazra, is a low islet on which are some tufts of grass. A shoal bank extends about 2½ miles southward from this islet and connects it with the reef on which lie Jazair Mahayimat. A detached shoal, with a depth of less than 6 feet ($1^{m}8$) over it, lies about 3 miles north-north-westward of Jazīrat Gaffai.

Machāsib, about 7 miles north-eastward of Jazīrat Gaffai, is a flat, rocky islet, about 7 feet ($2^{m}1$) high, fringed by a reef extending as much as 1½ miles offshore. A channel about 1½ miles wide, in which there are depths of from 24 to 30 feet ($7^{m}3$ to $9^{m}1$), separates the fringing reef from Umm al Umbar, an extensive shoal south-eastward; the limits of Umm al Umbar have not been determined. A 25-foot ($7^{m}6$) patch lies about 1½ miles west-south-westward of Machāsib.

A detached shoal, with depths of 12 feet ($3^{m}7$) over it, lies about 2½ miles north-north-eastward of Ras al Hazra, and close northward of this shoal is an extensive shoal, with depths of from 6 to 18 feet ($1^{m}8$ to $5^{m}5$) over it. Some patches, with depths of from 9 to 18 feet ($2^{m}7$ to $5^{m}5$) over them, lie close off the western edge of the reef on which lie Faraijdat and Jazair Mahayimat. Two patches, with depths of 24 and 30 feet ($7^{m}3$ and $9^{m}1$) lie, respectively, about 3½ miles westward and 4 miles west-north-westward of Jazair Mahayimat.

A 20-foot ($6^{m}1$) patch lies about 1¾ miles north-eastward of Ras al Hazra; and patches, with depths of 26, 23, 21 and 14 feet ($7^{m}9$, $7^{m}0$, $6^{m}4$ and $4^{m}3$), lie, respectively, 3, 6¾, 9¼ and 10½ miles northward of Ras al Hazra (*Lat. 24° 23′ N., Long. 51° 35′ E.*).

Vessels should pass westward of the above-mentioned shoals.

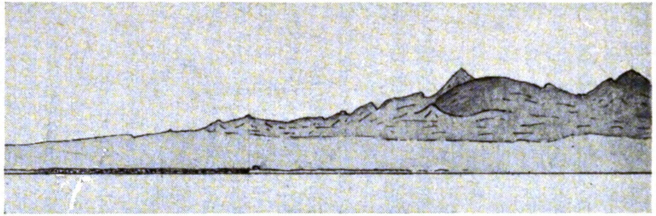
Coast.—**Dangers.**—Between Ras al Hazra and Ras Bu Kamheiz, about 12½ miles north-north-westward, the coast recedes forming a bay, at the head of which is Khōr adh Dhuwaihīn. The shores of this bay, except in the vicinity of Khōr adh Dhuwaihīn, consist of low white cliffs.

Within 7½ miles north-westward of Ras al Hazra there are numerous shoals, with depths of less than 18 feet ($5^{m}5$) over them, on which lie Jazair Ghagha and a number of above-water and sunken rocks.

The most important islets of Jazair Ghagha are Jazīrat Ghagha, Qasar Khuyain and Qasar Haram. Jazīrat Ghagha is about 20 feet ($6^{m}1$) high and lies about 2½ miles north-westward of Ras al Hazra (*Lat. 24° 23′ N., Long. 51° 35′ E.*); it is in the shape of a horseshoe

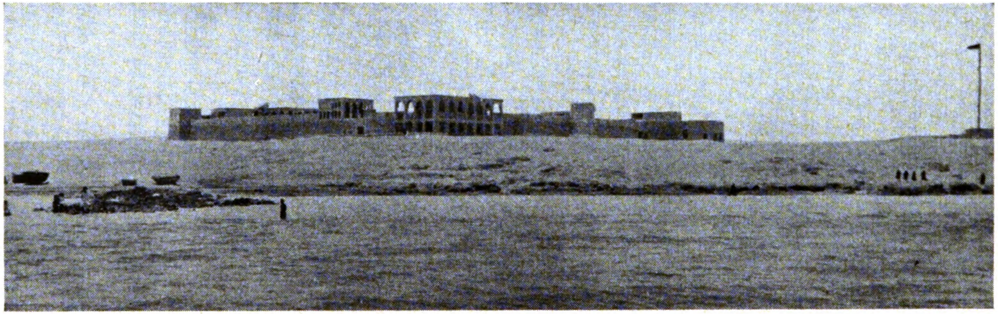
Charts 2837, 2858, 748b.

To face page 180.


Highest foothill and edge of cliffy coastline in line, bearing 191°.
Qarn al Khabta, bearing 193°, distant 7°2 miles.
Mount Stewart.
Mat hut.

Jazīrat al Yās from north-north-eastward.

(*Original dated* 1934.)



Fort at Dōha from north-eastward, distant about 4 cables.

(*Original dated* 1933.)

Chart 3707.

with a lagoon, the entrance to which is in its north-eastern side. An 18-foot ($5^{m}5$) patch lies about 3½ miles northward of Jazīrat Ghagha, and a shoal was reported, in 1935, to lie about 3 miles farther northward.

The shore of the bay for about 2 miles south-westward of Ras Bu Kamheiz is fringed by a shoal bank, extending as much as one mile offshore, on which lie some islets.

The head of this bay is encumbered with shoal patches, with depths of from 9 to 18 feet ($2^{m}7$ to $5^{m}5$) and the bottom is mud.

Ras Bu Kamheiz is the low, rocky eastern extremity of the promontory forming the south-eastern side of Khōr al ʻOdaid. An 18-foot ($5^{m}5$) patch lies about 1¾ miles south-south-eastward of this point, but in 1955, was reported to lie about 3 miles further eastwards.

Fasht Umm Janna, with depths of 6 feet ($1^{m}2$) over it, lies with its outer edge about 2½ miles eastward and northward of Ras Bu Kamheiz, from which it is separated by a narrow channel leading north-westward. Two patches, with depths of 23 and 24 feet ($7^{m}0$ and $7^{m}3$), respectively, lie about one mile off the north-eastern edge of Fasht Umm Janna.

Khōr al ʻOdaid.—This inlet trends about 9 miles south-westward along the north-western side of the promontory of which Ras Bu Kamheiz is the eastern extremity. The south-eastern shore of the inlet consists of rocky hills named Jabal al ʻOdaid, but on the north-western side are sand hills, named Niqa al Mahākaf, from 50 to 80 feet ($15^{m}2$ to $24^{m}4$) high, round in shape, white and barren. The inlet is frequented in winter by fishermen, who remain some months; very fine mullet can be caught.

The north-eastern end of Jabal al ʻOdaid rises immediately within the south-eastern entrance point of the inlet (*Lat. 24° 37′ N., Long. 51° 27′ E.*) to an elevation of 190 feet ($57^{m}9$); it is light in colour and has a table top, the edge of which is indented; about 1½ miles south-westward, the ridge is about 300 feet ($91^{m}4$) high.

On the southern side of the entrance of the inlet, between its outer entrance point and a low rocky point 2½ miles farther westward, there is a sandy beach.

A reef, on which lie three rocks, extends about one mile eastward and half a mile northward from the southern entrance point of the inlet. Another reef, on the edge of which there are also three rocks, extends about half a mile north-eastward and three-quarters of a mile west-south-westward from the inner point.

An 18-foot ($5^{m}5$) patch lies close off the northern entrance point.

A sandy shoal extends about 2 miles along the northern shore of the entrance; there is deep water between its outer part and the shore, but there is no passage through into the khōr.

The narrow channel into the inlet, in which there is a depth of 6 feet ($1^{m}8$), lies between the sandy shoal and the reefs extending from the southern shore. Farther in, the channel is contracted by banks and rocky islets and has depths of from 12 to 24 feet ($3^{m}7$ to $7^{m}3$). The head of the inlet is a lagoon which is shallow at its entrance, but in its middle part the chart shows a depth of 30 feet ($9^{m}1$). The water in the lagoon and in the inlet is of a blue colour and very clear.

Anchorage.—Directions.—Anchorage may be obtained off the northern outer entrance point of Khōr al ʻOdaid, about 2 cables offshore, in depths of from 6 to 10 fathoms ($11^{m}0$ to $18^{m}3$), sand and

Charts 2837, 2858, 748b.

Chart 3707.

shells, with the north-eastern summit of Jabal al 'Odaid bearing 170°; it is just inside a slightly projecting sandy point, off which there is no reef, and northward of the sandy shoal in the entrance of the khōr. It is difficult to estimate the distance from the white sand hills on the north-eastern side of the khōr, which appear farther off than they are.

The anchorage is sheltered from the shamāl and, owing to the extensive reefs seaward of it, the nashi does not raise very much sea.

A vessel approaching the anchorage should keep rather towards the shore northward of it, to avoid the outer end of the sandy shoal in the entrance of the khōr. Fasht Umm Janna shows up well and is steep-to, except for the two patches mentioned on page 181.

Chart 3787.

Coast.—Dangers.—Light.—Beacons.—Light-buoy.—Mooring buoy.—Jabal an Niqyān is an irregular range of white sand hills, up to 150 feet ($45^{m}7$) high, bordering the coast for about 18 miles north-north-eastward of the northern entrance point of Khōr al 'Odaid; the northernmost of these hills, Nagā Abu 'Anfūs, is 138 feet ($42^{m}1$) high. About 3 miles farther north-eastward, at Umm Said, the coast recedes, forming Dōhat Umm Said, whence it continues north-north-eastward about 4 miles to Ras al 'Alāj, which is marked by a steel framework tower 50 feet ($15^{m}2$) high, with a black square topmark. An oil terminal, consisting of two floating pipe-lines with mooring buoys off them, is situated, in depths of from 7 to 9 fathoms ($12^{m}8$ to $16^{m}5$), about one mile south-eastward of Nagā Abu 'Anfūs.

This part of the coast is low-lying and large areas near Dōhat Umm Said are liable to inundation at very high tides. Fasht al Arrif extends about 7 miles south-eastward from the coast about 1½ miles southward of Ras al Alāj. Al Bushairiyah, a low islet on which fishermen's huts are occasionally erected, lies on the south-western side of the reef and about 1½ miles offshore; a steel framework tower, 50 feet ($15^{m}2$) high, with a black square topmark, stands on the islet.

A number of buildings exist near the coast in the vicinity of Umm Said; amongst these there is a distillation plant with a conspicuous black chimney, 40 feet ($12^{m}2$) high, situated about 1¾ miles south-westward of Al Bushairiyah (*Lat. 24° 58′ N., Long. 51° 37′ E.*).

A jetty extends about 1¼ cables north-north-eastward from a position close westward of the distillation plant, forming a boat harbour.

There is a mooring buoy about half a mile south-eastward of the conspicuous chimney.

A conical light-buoy, painted black and exhibiting a *white quick-flashing* light, is moored about 2¾ cables south-eastward of the conspicuous chimney.

A light is exhibited from a mast off the north-eastern extremity of the sandy spit extending north-eastward from the reef on which stands the conspicuous chimney.

Fasht al Arrif is marked on its eastern, southern and south-western sides by beacons which are named as follows :—

Jessoura, a steel framework tower, 50 feet ($15^{m}2$) in height, with a black square topmark, stands on the eastern side of the reef, nearly 3½ miles south-eastward of Ras al 'Alāj; Shahin, consisting of a small iron tripod surmounted by a pole and standing on a rock foundation, is situated about 5¼ miles south-eastward of Ras al 'Alāj; a beacon,

Charts 3950, 2837, 2847, 2858, 748b.

Chart 3787.

consisting of a pole on a rock foundation, stands about 1¾ miles southward of Shahin; Nasr, a similar structure to Jessoura, stands near the south-eastern end of the reef, about 2½ miles southward of Shahin; Ghazal, also similar, stands on the south-western side of the reef, about midway between Nasr and Al Bushairiyah.

Chart 3707.

Off-lying islets and dangers.—A shoal patch with a depth of 4 feet ($1^{m}2$), lies about 4½ miles north-north-eastward of the north-eastern summit of Jabal al 'Odaid and 1½ miles offshore; an area, with depths of from 6 to 18 feet ($1^{m}8$ to $5^{m}5$), lies about 2 miles north-eastward of this shoal, and in the middle of this area there is a large coral head with depths of less than 6 feet ($1^{m}8$).

Chart 3950.

Las Hat is a group of three flat-topped islets and two detached rocks lying about 14½ miles north-eastward of Jabal al 'Odaid (*Lat. 24° 35′ N., Long. 51° 25′ E.*). These islets, which are about 25 feet ($7^{m}6$) high, are bordered by light-coloured cliffs. A shoal, with a depth of 10 feet ($3^{m}0$), lies about half a mile south-eastward of the south-western islet of the group; an extensive area, with a depth of 9 feet ($2^{m}7$), lies about 3½ miles southward of the same islet. A shoal, on which there is a large coral head with a depth of less than 6 feet ($1^{m}8$), lies about 4 miles east-south-eastward of Las Hat, and a large area, with a depth of 8 feet ($2^{m}4$), lies about 2½ miles farther south-eastward; there is a channel with a least depth of 26 feet ($7^{m}9$) between these two shoal. About 1½ miles north-eastward of Las Hat there is a small 15-foot ($4^{m}6$) patch, and 1¼ miles farther in that direction, there is a large sand bank that dries. An 18-foot ($5^{m}5$) patch is situated about 5 miles eastward of Las Hat. A shoal, with a depth of 3 feet ($0^{m}9$), which is easily distinguished by the discoloured water over it, lies about 3 miles northward of Las Hat. An 18-foot ($5^{m}5$) shoal, on the northern end of which there is a coral head with a depth of less than 6 feet ($1^{m}8$), lies about 1¼ miles offshore 6½ miles north-westward of Las Hat and between them is an isolated patch with a depth of 20 feet ($6^{m}1$). Westward of Las Hat there is a large area of deep water, but eastward as far as the southern end of Fasht al 'Odaid the depths are irregular, ranging from 4 to 14 feet ($7^{m}3$ to $25^{m}6$). The southern and western limits of Fasht al 'Odaid are bounded by a coral reef covered by an extensive sand bank, much of which dries; owing to the light green colour of the water, it is clearly visible at all states of the tide.

Charts 3707, 3950.

About 5 miles southward of Fasht al 'Odaid lies Machāsib (*Lat. 24° 39′ N., Long. 51° 49′ E.*), a low flat island that is described on page 180. A channel, about 2 miles wide, lies between these two reefs, which leads northward and north-eastward separating Fasht al 'Odaid from Hālat Dalma. Hālat Dalma, about 10 miles north-eastward of Machāsib is an extensive shoal in the middle of which lies a large coral reef, covered with patches of sand, that dries. The above-mentioned channel divides south-westward of Hālat Dalma, one branch leading southward of that shoal. The north-eastern branch of the channel leads round the western and northern edges of the reef into a large open area between Hālat Dalma and Jazīrat Shurā'awa. There are general depths of from 26 to 51 feet ($7^{m}9$ to $15^{m}5$) in the

Charts 2837, 2847, 2858, 748b.

Charts 3707, 3950.

channel, but two shoals, with depths of less than 18 feet (5^{m}5) over them, lie in mid-channel between Fasht al 'Odaid and Hālat Dalma.

Chart 3950.

The south-western extremity of Rig (Rak) Kareinein lies about 5½ miles north-westward of Hālat Dalma.

The channel southward of Hālat Dalma leads eastward into deep water, but an 8-foot (2^{m}4) shoal lies across the eastern entrance.

Neither of the channels described about should be attempted without local knowledge, as the water is opaque and the usual signs of discoloured water marking the limits of the shoals are lacking.

Chart 3787.

Outer and Inner channels.—Dangers.—Buoyage.—Anchorage.—South-westward of Fasht al Arrif (page 182) there is an extensive bank with depths of from 20 to 30 feet (6^{m}1 to 9^{m}1). Between the north-eastern end of this bank and the south-western part of Fasht al Arrif there is a passage, about half a mile wide between the 5-fathom (9^{m}1) lines, obstructed in its centre by a shoal with a depth of 26 feet (7^{m}9); the buoyed channel to Umm Said lies south-westward of this shoal.

Fasht al Arrif dries in patches and under most conditions shows up well. A bank, with a depth of 21 feet (6^{m}4) at its southern end and depths of 14 and 18 feet (4^{m}3 and 5^{m}5) about half a mile farther northward, extends about 1½ miles south-south-westward from the southern end of the reef.

A bank, on which there are sunken rocks and depths of less than 18 feet (5^{m}5), lies within about one mile north-eastward of Nasr beacon; from this bank depths of less than 30 feet (9^{m}1) extend southward for about 3 miles.

The channel between Fasht al Arrif and Fasht al 'Odaid is about 4 miles wide, but is reduced to a width of about 2½ miles between the 5-fathom (9^{m}1) lines.

From the vicinity of Ras al 'Alāj, a bank, with general depths of less than 36 feet (11^{m}0), extends about 9 miles south-eastward to within 2 miles of the off-lying reef north-eastward of Fasht al 'Odaid (*Lat. 24° 50′ N., Long. 51° 50′ E.*); on it are numerous heads with depths of from 17 to 28 feet (5^{m}2 to 8^{m}5); heavy overfalls at certain times are a feature of this area. Through the bank, a narrow channel, known as the Outer channel, about 6 miles in length, with its northern end about 4½ miles eastward of Ras al 'Alāj, runs in a southerly direction. The general depths in the fairway of the channel are from 36 to 42 feet (11^{m}0 to 12^{m}8), but detached patches with depths of from 33 to 35 feet (10^{m}1 to 10^{m}7) exist in the vicinity.

Under favourable conditions, shoals with depths of less than 36 feet (11^{m}0), can generally be distinguished by the lighter colour of the water over them, but this is not an indication to be relied upon as some shoals appear as darker patches and others give no indication of their existence.

The Outer channel, referred to above, in the approach to Umm Said anchorages, is marked by light-buoys, numbered from northward. The light-buoys marking the western side of the channel are black conical and numbered 1, 3, 5, 7 and 9; those on the eastern side of the channel are red can and numbered 2, 4, 6, 8 and 10. No. 1 buoy exhibits a *white flashing* light *every two seconds*; No. 2 a *red flashing*

Charts 2837, 2847, 2858, 748b.

Chart 3787.

light *every three seconds*; No. 3 a *white group flashing* light, showing *three* flashes *every fifteen seconds*; No. 4 a *red group flashing* light, showing *two* flashes *every ten seconds*; No. 5 a *white flashing* light *every six seconds*; No. 6 a *red flashing* light *every six seconds*; No. 7 a *white group flashing* light showing *three* flashes *every fifteen seconds*; No. 8 a *red group flashing* light showing *two* flashes *every ten seconds*; No. 9 a *white flashing* light *every two seconds*; and No. 10 a *red flashing* light *every two seconds*.

In 1953, the least depth in the Outer channel was 35 feet ($10^{m}7$), and was to be found about 2½ cables southward of Nos. 1 and 2 light-buoys.

The channel south-eastward of Fasht al Arrif, and the channel leading northward and westward to Umm Said anchorages, situated about 3 miles south-westward of Umm Said, is known as the Inner channel; it is marked by light-buoys as follows:—

" S.E. Arrif " conical light-buoy, painted black, and exhibiting a *white group flashing* light showing *three* flashes *every fifteen seconds*, is moored about 1¾ miles east-south-eastward of Nasr beacon, which marks the south-eastern side of Fasht al Arrif.

" S. Arrif " conical light-buoy, painted black and white in chequers and exhibiting a *white flashing* light *every ten seconds*, is moored about 2¼ miles south-south-westward of Nasr beacon.

The starboard side of the channel leading north-north-westward from " S. Arrif " light-buoy is marked by Nos. 1 and 3 black conical light-buoys: the port side of the channel is marked by Nos. 2 and 4 red can light-buoys. No. 1 buoy exhibits a *white group flashing* light, showing *three* flashes *every fifteen seconds*; No. 2 a *red flashing* light *every six seconds*; No. 3 a *white flashing* light *every two seconds*; and No. 4 a *red group flashing* light, showing *three* flashes *every fifteen seconds*.

About 6½ cables north-westward of Nos. 3 and 4 light-buoys, of the Inner channel, is moored a turning light-buoy, can-shaped and painted red and white in chequers, exhibiting a *red group flashing* light showing *two* flashes *every ten seconds*.

Umm Said.—Anchorage.—Mooring buoys.—Beacons.—Umm Said anchorage is marked by three light-buoys. Of these, " E. Anchorage " can light-buoy, painted red, and exhibiting a *red flashing* light *every ten seconds*, is moored about 3½ miles south-eastward of Umm Said (*Lat. 24° 57′ N., Long. 51° 38′ E.*); " N. Anchorage " conical light-buoy, painted black, and exhibiting a *white flashing* light *every two seconds*, is moored about 3 miles south-south-westward of Umm Said; and " S. Anchorage " can light-buoy, painted red, and exhibiting a *red flashing* light *every six seconds*, is moored nearly 4¾ miles south-westward of Umm Said.

In 1953, the least depth in the Inner channel and approach to Umm Said anchorages was 38 feet ($11^{m}6$), and was to be found between Nos. 3 and 4 light-buoys.

Two oiling berths, each with four mooring buoys, are situated in the anchorage at Umm Said. A number of beacons stand on the shore abreast these berths.

Tides and tidal streams.—The tides in this area have a large diurnal component, and at times only one high water and one low water occur during the twenty-four hours. This feature is more

Charts 3950, 3707, 2837, 2847, 2858, 748b.

Chart 3787.

pronounced at Umm Said than at Dōha (page 191). Meteorological conditions may affect the tides by as much as plus or minus 2 feet ($0^{m}6$).

At the northern end of the Outer channel, where the limiting depth of 35 feet ($10^{m}7$) exists, the time of high water is approximately one hour before that of Umm Said, and the rise of tide is less than at Umm Said, comparing more closely with Dōha.

Westward of Rig (Rak) Kareinein (*see* page 188) the tidal streams set nearly parallel with the shore and do not much exceed a rate of one knot. In the channel between Fasht al Arrif and Fasht al 'Odaid the streams set north-north-eastward and south-south-westward and attain a rate of more than 2 knots at springs; south-westward of Fasht al Arrif there is little tidal stream.

In the Outer and Inner channels of the approach to Umm Said the flood stream generally sets south-south-westward, and the ebb stream north-north-eastward, the rate being up to 2 knots at springs. Cross sets will consequently be experienced in these channels, more particularly in the northern part of the Outer channel and in the vicinity of " S.E. Arrif " light-buoy, and also in the Inner channel, between " S. Arrif " light-buoy and the turning light-buoy (*Lat. 24° 55′ N., Long. 51° 39′ E.*).

Directions.—Caution.—Pilotage.—The approach from northward to the Outer channel is described on page 188.

Having passed between Nos. 1 and 2 Outer channel light-buoys, a vessel should steer 173½°, passing between Nos. 3 and 4 light-buoys, to Nos. 5 and 6 light-buoys. From there a course of 193° should be steered to Nos. 7 and 8 light-buoys, and of 174° to Nos 9 and 10 light-buoys.

From a position about midway between Nos. 9 and 10 light-buoys the vessel should steer about 157° to leave " S.E. Arrif " light-buoy to starboard, thence 217° to leave " S. Arrif " light-buoy also to starboard.

After rounding " S. Arrif " light-buoy the vessel should steer about 331° to pass close westward of No. 1 Inner channel light-buoy, thence 003° to pass close eastward of No. 2 Inner channel light-buoy. From here the vessel should steer about 341° so as to pass between Nos. 3 and 4 light-buoys, and should then steer about 305° to pass close north-eastward of the turning light-buoy. From the turning light-buoy the vessel should steer about 260° for the anchorage, passing northward of " E. Anchorage " light-buoy.

In 1953, depths in the Outer and Inner channels were such that vessels drawing 31 feet ($9^{m}4$) or less could navigate them at any state of the tide, the draught of vessels leaving Umm Said being controlled by the depth of water to be expected over the 35-foot ($10^{m}7$) patch at the northern end of the Outer channel.

A vessel passing through the Outer channel is advised to proceed at moderate speed when passing close to shoal patches, to avoid " draw down " and " canal action." On the outward passage from Umm Said, it was recommended that speed should be reduced before rounding the turning light-buoy, and that the passage of the Inner channel should be made at slow speed to avoid increase of draught due to " draw down " and " heel under helm " action.

Pilotage is carried out by the Oil Company's pilots, who will board vessels off " Waqra " light-buoy.

Charts 3950, 3707, 2837, 2847, 2858, 748b.

Chart 3787.

Anchorage.—Good anchorage may be obtained about 4 miles south-south-westward of Umm Said and from half a mile to one mile offshore, in depths of from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$), or in less depths nearer Umm Said (*Lat. 24° 57′ N., Long. 51° 35′ E.*); in this anchorage there is good shelter from the shamāl, and the off-lying reefs afford a considerable degree of protection from the nashi; small craft can find good shelter in Dōhat Umm Said, care being taken to avoid the reef, and the rocks which dry 6 feet ($1^{m}8$), lying within 4 cables of Umm Said.

Coast.—Dangers.—Buoyage.—Light-floats.—Beacons.—From Ras al ʻAlāj the coast trends northward about 7½ miles to Jabal al Waqra (Wakrah), a brown level-topped rocky hill, 74 feet ($22^{m}6$) high, and consists of a low sandy or stony desert fringed by a coastal reef which extends from half a mile to 1¾ miles offshore, the 3-fathom ($5^{m}5$) line running nearly parallel with the coast from 1¾ to 2¾ miles offshore. Umm al Hul, a ruined and deserted village, situated about 3¾ miles northward of Ras al ʻAlāj, stands on the western side of a narrow almost landlocked bay which dries at about half tide. Numerous rubble fish traps lie close inshore between Umm al Hul and Jabal al Waqra.

A steel framework tower, 50 feet ($15^{m}2$) in height, with a black square topmark, is situated at Umm al Hul; a similar structure stands near the summit of Jabal al Waqra.

" Hul " pillar light-buoy, painted red with the letter H in white on two sides of its superstructure and exhibiting a *white group flashing* light showing *four* flashes *every twenty seconds*, is moored about 5 miles south-eastward of Umm al Hul, and about 2 cables westward of a shoal with a depth of 33 feet ($10^{m}1$) over it.

Abreast this part of the coast, westward of Rig Kareinein and from 6 to 8 miles offshore, lies an extensive shoal with depths of less than 36 feet ($11^{m}0$), on which there are depths of from 24 to 30 feet ($7^{m}3$ to $9^{m}1$) in the northern part, and of 12 to 18 feet ($3^{m}7$ to $5^{m}5$) in the southern part.

" Waqra " pillar light-buoy, painted red with the letter W in white on two sides of its superstructure and exhibiting a *white group flashing* light showing *three* flashes *every twenty seconds*, is moored about 4¾ miles eastward of Jabal al Waqra.

From Jabal al Waqra the coast, which is low, trends northward about 7½ miles to Ras Abu al Mishūt, a low rocky point not easily identified from seaward; within the coast, the desert rises gradually to heights of from 30 to 50 feet ($9^{m}1$ to $15^{m}2$) about 3 to 4 miles inland. A clump of trees in a garden about 3½ miles westward of Ras Abu al Mishūt is conspicuous.

A steel framework tower, 50 feet ($15^{m}2$) in height, with a black square topmark, stands about 4½ cables south-westward of Ras Abu al Mishūt.

Al Waqra (Wakrah), an extensive but largely ruined and deserted town, is situated in a shallow bight in the coast about one mile north-north-westward of Jabal al Waqra; a fort with a square tower and a flagstaff stands near the shore in the northern part of the town, with a minaret a short distance south-westward. There is a small stone wharf in front of the fort at which small dhows can berth at high water. Off the northern end of the town a well-sheltered boat harbour, which

Charts 3950, 3707, 2837, 2847, 2858, 748b.

Chart 3787.

dries but can be entered near high water, is formed between the coast and a high narrow bank of sand which extends about one mile southward from a position on the coast, about 1½ miles north-north-eastward of the minaret in Al Waqra. A track, which can be used by motor traffic, runs from Al Waqra through Dōha, about 8½ miles north-north-westward, to the western side of Al Qatar peninsula.

Between Jabal al Waqra and Ras Abu al Mishūt the coast is fronted by a bank, with depths of less than 18 feet ($5^{m}5$), extending from 5 to 7 miles offshore; numerous rubble fish traps lie close inshore. North-eastward of Al Waqra an area of thick weed extends about half a mile offshore. Two patches with depths, respectively, of 22 and 23 feet ($6^{m}7$ and $7^{m}0$), lie about 4 cables apart, 3 miles east-north-eastward of Jabal al Waqra.

Charts 3787, 3950.

Several detached patches, with depths of from 30 to 33 feet ($9^{m}1$ to $10^{m}1$), lie from 5 to 7 miles eastward of Ras Abu al Mishūt. Three shoals, with depths of 35 feet ($10^{m}7$), lie about 4 miles farther eastward, and two others, with depths, respectively, of 33 and 35 feet ($10^{m}1$ and $10^{m}7$), lie about 14 and 14½ miles east-north-eastward of the point.

Chart 3950.

A bank, with a depth of 33 feet ($10^{m}1$) over it, lies about 16 miles east-north-eastward of Jazīrat ‘Alya (page 189); a detached 6-fathom ($11^{m}0$) patch lies about 4 miles north-north-eastward of this bank.

A 33-foot ($10^{m}1$) patch lies on a detached bank, with depths of less than 10 fathoms ($18^{m}3$) over it, about 28 miles east-north-eastward of Jazīrat ‘Alya (*Lat. 25° 25′ N., Long. 51° 34′ E.*).

Charts 3787, 3950.

Rig (Rak) Kareinein, an extensive shoal, extends about 20 miles northward from a position close northward of Fasht al ‘Odaid. A beacon, consisting of a circular rubble tower, 12 feet ($3^{m}7$) high, stands near the eastern side of Rig Kareinein and about 19 miles eastward of Jabal al Waqra; within a radius of one-half to three-quarters of a mile of this tower there are numerous rocks, awash, or dry at low water; this patch of rock is known as Hālat Bul Khaipān. There may be other patches on Rig Kareinein which dry and have not been closely examined. There is a narrow channel, with depths of from 7 to 9 fathoms ($12^{m}8$ to $16^{m}5$), between Rak Kareinein and Fasht al ‘Odaid. Except on its western side the limits of Rig Kareinein are not accurately known and vessels should give it a wide berth.

Chart 3787.

" Mishūt " light-float, painted black with the letter M in white on each side of the superstructure and exhibiting a ***white group flashing*** light showing ***two*** flashes ***every twenty seconds,*** is moored off the north-western part of Rig Kareinein, about 10 miles eastward of Ras Abu al Mishūt.

Chart 3950.

" Kareinein " light-float, painted black with the letter K in white on each side of the hull and exhibiting a ***white flashing*** light ***every ten seconds,*** is moored off the northern part of Rig Kareinein, about 19 miles north-eastward of Ras Abu al Mishūt.

Chart 3787.

Anchorage.—Directions.—Tidal streams.—A large vessel can anchor in depths of from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$) about 3 miles

Charts 3707, 2830, 2837, 2847, 2858, 748b.

Chart 3787

offshore eastward of Jabal al Waqra, taking care to avoid the two 22- and 23-foot ($6^{m}7$ and $7^{m}0$) shoals about 3 miles east-north-eastward of that summit; smaller vessels can anchor in convenient depths closer inshore. There is, however, very little shelter from the prevailing winds off this coast.

Charts 3787, 3950.

A vessel approaching the anchorage off Al Waqra, or that southward of Umm Said (page 185), from eastward, should sight Jazīrat Halul (page 192) and, having brought it to bear 055½°, astern, steer to make good 235½°, towards the town of Al Waqra, keeping the island bearing 055½° passing close northward of " Kareinen " light-float and about 2½ cables north-westward of " Mishūt " light-float. Jabal al Waqra and the clump of trees westward of Ras Abu al Mishūt will usually be the first land objects sighted when about 12 miles distant; and the town of Al Waqra should be visible ahead soon after.

Chart 3787.

When " Mishūt " light-float bears 090°, distant about half a mile, and the fort with the flagstaff at Al Waqra is distant 11½ miles, bearing 235½°, course should be altered to make good 213° towards " Waqra " light-buoy, and when that light-buoy bears 090°, distant about 2 cables, and the 50-foot ($15^{m}2$) steel framework tower on Jabal al Waqra bears 266°, distant about 4½ miles, course may be shaped for the desired anchorage off Al Waqra (*Lat. 25° 10′ N., Long. 51° 37′ E.*).

A vessel continuing southward to Umm Said anchorage from a position about 2 cables westward of " Waqra " light-buoy should steer 180° for about 6½ miles to a position about 2 cables westward of " Hul " light-buoy, when the 50-foot ($15^{m}2$) tower on Ras al 'Alāj should bear 246°, distant about 4 miles. The vessel should then steer 164° for about 2 miles towards Nos. 1 and 2 Outer channel light-buoys and, when the tower on Ras al 'Alāj bears 272°, distant about 4½ miles, the vessel will then be in the entrance to the Outer channel, and the directions given on page 186 should be followed.

Charts 3787, 3950.

Tidal streams in the offing set north-north-eastward and south-south-westward, and attain a maximum rate of about 1½ knots; they are diurnal in character. For the tidal streams westward of Rak Kareinein *see* page 185.

Approaches to Dōha.—Dangers.—Light.—Buoyage.—From Ras Abu al Mishūt the coast trends about 4½ miles north-westward and westward and thence about 6½ miles northward to abreast Jazīrat 'Alya, forming a bay with the town of Dōha at its southern end. The land on the southern and western sides of the bay consists of undulating desert rising to elevations of from 40 to 50 feet ($12^{m}2$ to $15^{m}2$) a few miles inland. There is no cultivation near-by except two small gardens near the town; the most easterly of these, on rising ground, contains the conspicuous clump of trees mentioned on page 187. The trees and buildings of the village of Markhiyah, on high ground about 3 miles north-westward of Dōha, are distinguishable from seaward.

Jazīrat 'Alya, about 8 miles north-north-westward of Ras Abu al Mishūt, is a barren sandy islet with a small hillock, 25 feet ($7^{m}6$) high, at its south-eastern end; it is separated from the coast westward by a boat channel in which the depths, westward of Jazīrat as Sāfliya

Charts 3707, 2830, 2837, 2847, 2858, 748b.

Charts 3787, 3950.

(page 190), are from one to 4 feet ($0^{m}3$ to $1^{m}2$). The channel is used by dhows and small craft but requires local knowledge.

Reefs and shoal water extend 4 miles eastward and 2½ mile northward from Ras Abu al Mishūt; northward of Dōha (*Lat. 25° 17′ N., Long. 51° 32′ E.*) it extends to as much as 10 miles offshore and the bottom may sometimes be seen before the land is sighted.

A light is exhibited, at an elevation of 27 feet ($8^{m}2$), from Dōha beacon situated on the northern edge of the reef, about 2¼ miles northward of Ras Abu al Mishūt.

A light-buoy, exhibiting a *white flashing* light *every twelve seconds,* is moored about 5 miles eastward; a light-buoy exhibiting a *white flashing* light *every six seconds,* is moored about 3½ miles east-north-eastward; and a light-buoy exhibiting a *white flashing* light *every three seconds,* is moored about 2½ miles north-north-eastward of Ras Abu al Mishūt. These light-buoys should be left close on the starboard hand when approaching Dōha.

A bank, with depths of less than 18 feet ($5^{m}5$) over it, extends up to 10 miles offshore between Ras Abu al Mishūt and Jazīrat 'Alya (*Lat. 25° 24′ N., Long. 51° 34′ E.*); on this bank there are depths of 8 feet ($2^{m}4$) about 5 miles north-north-eastward of Ras Abu al Mishūt and of from 2 to 3 feet ($0^{m}6$ to $0^{m}9$) about 3 miles east-south-eastward of Jazīrat 'Alya.

Two detached 18 foot ($5^{m}5$) patches, about 7 cables apart, lie about 7½ miles eastward of Jazīrat 'Alya·

A 33-foot ($10^{m}1$) patch lies on a bank, with depths of less than 10 fathoms ($18^{m}3$) over it, about 28 miles east-north-eastward of Jazīrat 'Alya. A bank, with a depth of 41 feet ($12^{m}5$) over it, lies about 12 miles eastward of Jazīrat 'Alya.

Chart 3787.

Harbour.—Beacons.—The harbour of Dōha lies north-westward of Ras Abu al Mishūt and is entered between the reefs extending northward from that point and south-eastward from Jazīrat as Sāfliya, about 4¼ miles north-north-westward.

Jazīrat as Sāfliya is low, sandy and covered with scrub; from its eastern and western ends, respectively, sand spits extend south-eastward and south-westward; between the extremity of the latter sand spit and an extensive area of reef and very shoal water which extends off the western side of the bay, there are depths of 2 fathoms ($3^{m}7$), and over. A circular masonry beacon, 6 feet ($1^{m}8$) high, marking the south-western side of the reefs and fish traps which extend off them, is situated about half a mile north-westward of the island.

Ras Abu Abūd, about 2½ miles north-westward of Ras Abu al Mishūt (*Lat. 25° 17′ N., Long. 51° 37′ E.*), is low, and off the intervening coast a shallow reef extends about 2 miles north-eastward with numerous rubble fish traps close inshore.

A reef, on which there are patches that dry and depths of less than 6 feet ($1^{m}8$), rock and sand, extends about 1½ miles southward and eastward from the eastern end of Jazīrat as Safliya, between which and Dōha light-beacon a channel 3 cables wide leads into the harbour.

Ras an Nisa'a, about 1½ miles westward of Ras Abu Abūd, is a low, rocky, projecting point with numerous buildings in its vicinity; a shallow spit extends about 3 cables northward from it. In the bay, westward, there are several shoal patches.

Charts 3707, 2830, 2837, 2847, 2858, 748b.

Charts 3787, 3950.

Tidal streams.—Anchorage.—Directions.—The tidal streams in the offing are described on page 189. In the vicinity of Dōha light-beacon at the entrance to the harbour, a marked set of the tidal stream in a direction opposite to that running in the offing is sometimes experienced.

Anchorage may be obtained about 6 miles eastward of Ras Abu al Mishūt, in depths of from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$) by vessels which are unable to enter the harbour at Dōha.

In the harbour at Dōha anchorage may be obtained, in depths of from 18 to 21 feet ($5^{m}5$ to $6^{m}4$), with the fort at Dōha (page 191) bearing 235°, distant about 13 cables, or in the centre of the harbour, in depths of from 3½ to 4 fathoms ($6^{m}4$ to $7^{m}3$), about 1½ miles northward of Ras Abu Abūd. The anchorage is well sheltered, except from north-easterly winds, and the holding ground is good, being sand and mud.

A vessel approaching Dōha from northward should steer parallel with the coast keeping in depths of from 5 to 6 fathoms ($9^{m}1$ to $11^{m}0$). For a distance of about 20 miles northward of Dōha the shoal coastal bank extends so far offshore that the mainland may not be sighted until a vessel is in the vicinity of the harbour. Jazīrat 'Aliya (*Lat. 25° 24′ N., Long. 51° 34′ E.*) may, however, be sighted, westward, from a distance of 10 miles. When the fort at Dōha bears 255° course may be altered for it, passing over the bank eastward of the harbour; this approach, in 1953, had a least depth of 12 feet ($3^{m}7$). When Dōha light-beacon bears 270°, course should be altered to 279° to pass 2¼ cables northward of it, and when abeam a vessel should steer 250° for the anchorage.

A vessel approaching Dōha from north-eastward or eastward should sight Jazīrat Halūl (page 192) and, having brought it to bear 055½° astern, steer to make good 235½°, keeping the island bearing 055½°.

The directions for the approach to " Mishūt " light-float, are given on page 189. When the light-float bears 083°, distant about 6 cables, the vessel should steer 263°, with the light-float bearing 083°, astern, to pass southward of the outer of the three light-buoys marking the approach to Dōha. Thence she should steer as requisite to leave the three light-buoys close on the starboard hand, until Dōha light-beacon bears 270°, whence she should proceed as directed above. The least depth in this approach is 12 feet ($7^{m}3$).

Chart 3787.

Dōha.—This town, situated on the southern side of the harbour, is the capital of Al Qatar peninsula and had a population, in 1947, of about 12,000.

The fort at Dōha (*see* view facing page 180), situated about one mile westward of Ras an Nisa'a (*Lat. 25° 17′ N., Long. 51° 33′ E.*), is of a light colour and a good mark; it is a very large square court-yard type of building with towers at its corners resembling square houses with colonnades and verandahs; in the centre of its north-western wall is a round tower. A flagstaff, 93 feet ($28^{m}3$) high, stands on rising ground close northward, and a white mosque with a minaret stands a short distance south-eastward of the fort.

The Shaik's palace, situated about 3½ cables south-eastward of Ras an Nisa'a, is a large building with many colonnades, and an open balustrade round its roof, and is easily identified from the harbour;

Chart 3787.

between the palace and Ras an Nisa'a a minaret having much the appearance of a lighthouse is also a useful mark. There are several other large buildings in the town, some with flagstaffs, all very similar to each other in appearance.

Landing can be effected in boats of shallow draft at the Custom-house jetty, situated about 9 cables westward of Ras an Nisa'a. Numerous local craft will be found at anchor off this jetty which practically dries at low water.

There is a small airfield situated close northward of the ruined village of Aneiza, about 3 miles north-north-westward of the fort at Dōha.

No fuel or other stores are available.

There is an American mission hospital with 28 beds near the Custom-house jetty. There are no quarantine regulations.

Trade.—The chief exports are gutch, fish and pearls; imports are food, timber and manufactured goods.

Chart 3950.

JAZĪRAT HALŪL.—Light.—This island, situated just within the edge of the Great Pearl bank (page 165), about 50 miles east-north-eastward of Ras Abu al Mishūt (*Lat. 25° 17′ N., Long. 51° 37′ E.*), is hilly and rises to an elevation of 202 feet (61^{m}6). It is fringed by a reef which, in places, extends about 3 cables offshore; shoal banks extend about 4 cables north-eastward and north-westward from the island, and depths up to 6 fathoms (11^{m}0) exist up to 6 cables from its southernmost part.

The island, which is visited by the pearling fleets, is barren but swarms with birds, chiefly cormorants, and in the season is covered with nests and young birds.

Depths in the vicinity of the island give little warning of its proximity, and there are tide rips around it, particularly on its southern side. A 36-foot (11^{m}0) patch, the existence of which is doubtful, lies about 14 miles north-westward of Jazīrat Halūl and detached banks, with depths of 43 feet (13^{m}1) over them, lie about 13½ miles south-westward and 8½ miles westward of the island.

A shoal with a depth of 42 feet (12^{m}8) over it, lies about 13½ miles eastward; and a 27 foot (8^{m}2) patch lies about 11½ miles south-south-eastward of Jazīrat Halūl.

Charts 3950, 3707.

A shoal, with a depth of 21 feet (6^{m}4) over it, was reported in 1951 by a vessel which struck it, about 13 miles south-south-eastward of Jazīrat Halūl; another patch, with a depth of 22 feet (6^{m}7) over it, lies about 1¾ miles north-westward of this shoal.

A 10-fathom (18^{m}3) patch lies about 13 miles north-eastward of Jazīrat Halūl; the depths in the vicinity are uneven. A similar patch lies about 13½ miles north-north-westward of the island.

A shoal, with a depth of 12 fathoms (21^{m}9), was reported, in 1953, to lie about 24 miles east-north-eastward of Jazīrat Halūl.

Chart 3517, plan of Jazīrat Halūl anchorage.

A light is exhibited, at an elevation of 220 feet (67^{m}1), from a white concrete tower with a black top, 16 feet (4^{m}9) in height, situated on the summit of Jazīrat Halūl.

Anchorage.—Anchorage may be obtained in depths of 7 fathoms

Chart 3517, plan of Jazīrat Halūl anchorage.

($12^{m}8$) about 4 cables off the south-eastern coast of Jazīrat Halūl, with the lighthouse bearing 335° and the eastern extremity of the island bearing 014°. This anchorage affords shelter during a shamāl though much swell rolls round both sides of the island; the bottom is sand and coral and the holding ground is good.

Landing may be effected, in small boats of shallow draught, on the sandy beach north-westward of the anchorage; during south-easterly winds landing here would be dangerous, but there is a more sheltered place on the south-western part of the island.

Chart 3950.

Caution.—Caution is necessary when navigating in the area between Jazīrat Halūl and Jazīreh Sirri (page 127). This area has not been thoroughly surveyed and uncharted shoals have been reported.

COAST.—Dangers.—Beacon.—Northward of Dōha the land is chiefly stony desert, with a few hillocks; farther northward it becomes very low. The bottom close to the coast is of white sand and rock, usually shows up well in clear water.

Dōhat Lūsail is a slight indentation in the coastline about 13 miles northward of Dōha, and is prominent from seaward on account of a ruined fort 45 feet ($13^{m}7$) in height; the land in this area is slightly higher than that of the adjacent coast. Dōhat Lūsail is shallow but is frequented by local dhows and pearling boats which shelter there during the shamāl.

At Sakhama (chart 3707), about 3 miles westward of the ruined fort at Dōhat Lūsail, there is a prominent ruined tower 50 feet ($15^{m}2$) high.

About 11 miles north-north-eastward of the tower of the ruined fort at Dōhat Lūsail is Ras an Nauf, a low rocky point. Ras al Matbakh (*Lat. 25° 40′ N., Long. 51° 34′ E.*) lies about 1½ miles north-eastward of Ras an Nauf and between lies the entrance to Khōr Shaqīq. The entrance to Khōr Shaqīq is marked by a beacon which stands about 1¼ miles westward of Ras al Matbakh, and the channel has depths of 6 feet ($1^{m}8$) in it; it is used by local craft but, without local knowledge, the passage should not be attempted at low water as, north-westward of the beacon, the channel is not marked and several dangerous shallow patches exist. The inlet itself is shallow with general depths of from one to 6 feet ($0^{m}3$ to $1^{m}8$). The village, in which there are several towers, the highest of which is 40 feet ($12^{m}2$) in height, is situated on rising ground at the western end of the inlet.

Al Jubail, a hill 33 feet ($10^{m}1$) high, is situated close to the coast about 1¾ miles northward of Ras al Matbakh.

Khōr adh Dhakhīra, about 4 miles northward of Ras al Matbakh, is small, shallow and affords little shelter; there is a village on the south-western side of the inlet. Ras Umm Sa is the south-eastern extremity of a sandy island which forms the northern side of the entrance to Khōr adh Dhakhīra.

Ras Laffān (*Lat. 25° 55′ N., Long. 51° 33′ E.*), about 14 miles northward of Ras al Matbakh, is very low and sandy; the coastal reef does not extend much more than half a mile from it.

There is a conspicuous cairn about 2½ miles westward of Ras Laffān.

About 4¼ miles north-westward of Ras Laffān is Ras Qartas from

Charts 3707, 2830, 2837, 2847, 2858, 748b.

Chart 3950.

which a narrow sand spit extends about 1¼ miles south-eastward; the coastal reef extends about 6 cables from Ras Qartas.

Off-lying dangers.—Light.—The coastal bank, with depths of less than 18 feet ($5^{m}5$), on which lie numerous patches that dry, extends from 2 to 12 miles offshore between Dōha and Ras Laffān.

Fasht al Hraabi, which dries, lies about 8 miles north-eastward of Dōhat Lūsail (*Lat. 25° 29′ N., Long. 51° 29′ E.*); there are depths of from 3 to 27 feet ($0^{m}9$ to $8^{m}2$) within about 2¼ miles westward of this patch, which should be given a wide berth as it is not always plainly visible. Burnaat maraqqat lies about 3 miles north-westward of Fasht el Hraabi and dries at its western extremity. Between these two reefs there is a shoal patch with a depth of 3 feet ($0^{m}9$) over it.

Ardh an Nauf is a reef which dries and lies on the coastal bank about 3 miles eastward of Ras al Matbakh; it is plainly visible within a distance of one mile and, during the shamāl, heavy seas break over it.

Fasht al Yabis, which nearly dries, lies about 1½ miles eastward of Ras Umm Sa.

Lights are exhibited at elevations of 60 feet ($18^{m}3$), one from the northern corner and one from the southern corner of an oil rig, situated about 5½ miles east-north-eastward of Ras Umm Sa.

Vessels of more than 12-foot ($3^{m}7$) draught should on no account proceed inside the 6-fathom ($11^{m}0$) line between Dōha and Ras Laffān. The coast can rarely be seen until near the 3-fathom ($5^{m}5$) line, and is difficult to recognize without local knowledge; a number of vessels have got into difficulty in shallow water on this part of the coast.

A bank, with a depth of 29 feet ($8^{m}8$) over it, lies just within the 10-fathom ($18^{m}3$) line about 9 miles north-eastward of Ras Umm Sa.

Anchorage.—Good anchorage for small craft can be obtained at the entrance to Khōr Shaqīq, which is sheltered from shamāls. In 1949, H.M.S. *Challenger* drawing 15½ feet ($4^{m}7$) anchored in a depth of 22 feet ($6^{m}7$) on a number of occasions, with Ras an Nauf bearing 267° and Al Jubail bearing 345°. Approach to this anchorage was made at high water crossing the 14-foot ($4^{m}3$) bar, in position 107°, 4 miles from Ras an Nauf, on a course of 281°; this course was steered until Al Jubail bore 345°, thence course was altered to this bearing towards the anchorage.

There is good shelter for large vessels with Ras an Nauf bearing 289° distant from 7½ to 11½ miles, in depths of from 4 to 6 fathoms ($7^{m}3$ to $11^{m}0$).

Chart 3790.

Coast.—Buoy.—Between Ras Laffān (*Lat. 25° 55′ N., Long. 51° 33′ E.*) and Ras Rākān, about 24 miles north-westward, there are no off-lying dangers except off the latter point.

Al Huwaila, about 6½ miles west-north-westward of Ras Laffān, is a ruined fort of which the four ruined towers alone are identifiable.

Between Ras Laffān and Al Huwaila a coral reef that dries extends about half a mile offshore.

Between Al Huwaila and Ras al Marūna, about 5 miles north-westward, is a small bay which affords shelter from the shamāl to native craft. At the head of the bay is the ruined village of Jusasiyah and Jabal Jusasiyah about three-quarters of a mile inland and 79 feet ($24^{m}1$) high, is a good mark.

Fuwairat, about 2 miles north-westward of Ras al Marūna, is a

Charts 2830, 2837, 2847, 2858, 748b

Chart 3790.

ruined village in which there is a minaret visible from close inshore; a short distance northward is Jabal Fuwairat, the only other well defined hill between Ras Laffān and Ras Rākān. Jabal Fuwairat is a long ridge of limestone **64** feet ($19^{m}5$) high at its southern end; a cairn stands on its summit.

At the village of Ain Sinan, about 2½ miles south-westward of Jabal Fuwairat, is a large clump of trees which, when not obscured by Jabal Fuwairat, can be identified up to a distance of 7 miles offshore.

Al Ghāriyah is a small fishing village, behind which are some low sandhills, situated about 2 miles northward of Jabal Fuwairat.

Ras Umm Hasā lies about 6 miles north-north-westward of Ras al Marūna, and the bay, which is entered between these two points, affords shelter to small craft from the shamāl.

The village of Al Mafijar is situated about 3½ miles north-westward of Ras Umm Hāsa. This village, and a hillock surmounted by a cairn about one mile north-westward of it, become visible before Ras Rākān when approaching from north-eastward.

Ras Rākān is the north-western extremity of a low sandy islet, which lies about 1¾ miles off the northern extremity of Al Qatar. The reef between the islet and the mainland dries.

A coral shoal, with a least depth of 31 feet ($9^{m}4$) over it, lies about 20 miles north-north-eastward of Ras Rākān (*Lat. 26° 11′ N., Long. 51° 40′ E.*), and a 34-foot ($10^{m}4$) patch lies about 3 cables south-eastward of this shoal.

A white spherical buoy is charted about 5 miles north-north-westward of Ras Rākān.

Charts 2830, 2837, 2847, 2858, 748b.

CHAPTER VII

PERSIAN GULF, SOUTH-WESTERN SIDE—WESTERN SIDE OF AL QATAR, BAHREIN ISLAND, AND THE COASTS OF NEJD AND KUWAIT—RAS RĀKĀN TO KHŌR ʻABDULLAH.

Chart 2847.

GENERAL REMARKS.—The whole coast between Ras Rākān and Jazīrat Būbiyān, about 260 miles north-westward, is a low sandy or stony desert with, here and there, a few small hills. The only vegetation, except near Al Qatif, situated about 69 miles west-north-westward of Ras Rākān, and in the vicinity of one or two other towns where there are date palms, is the coarse grass growing in tufts on the sand hills and the occasional small brushwood. As far northward as Ras al Mish'āb, 186 miles north-westward of Ras Rākān, the coast is fronted by extensive reefs ; and off it lie Jazīrat Bahrein (*see* page 201), and many low islets. With the exception of a few towns, this coast is rarely visited by Europeans. There are large tracts without villages or any settled inhabitants, and it is probably unsafe to wander away from the towns on the mainland without an armed escort.

The coast southward of Ras Rākān (*Lat. 26° 11′ N., Long. 51° 14′ E.*) forms the eastern side of Dōhat-as-Salwa, an extensive bay, off the entrance of which is Jazīrat Bahrein. Reefs extend from the eastern side of Jazīrat Bahrein to within 5 miles of the western coast of Al Qatar, and southward of them the bay has not been surveyed, but in 1901 it was reported to be encumbered with reefs and shoals.

For tidal streams, *see* page 221.

Chart 3790.

WESTERN SIDE OF AL QATAR.—Coast.—Buoyage.—Danger.—Between Ras Rākān and Ras 'Ashairiq, about 17 miles south-westward, the coast is low and of so light a colour that it is difficult to distinguish, especially when enveloped in the prevailing haze.

All the villages on the north-western coast of Al Qatar were, in 1951, deserted and in ruins, having been sacked in recent years ; a few fishermen sometimes camp temporarily among the ruins.

A reef fringes this coast to within about 1¼ miles of Ras 'Ashairiq and extends from 2 to 3 miles offshore ; it nearly all dries and is plainly visible in a good light ; landing, except at high water, is very difficult.

Ras Abu 'Amrān, about 2½ miles south-south-westward of Ras Rākān, is low, but rises to a small rocky mound. About 1½ miles farther in the same direction is Abu Dhalūf, a small town.

Charts 2837, 2858, 748b.

Chart 3790.

The small village of Al Jumail lies 3½ miles south-south-westward of Ras Abu ‘Amrān ; about 3 cables inland from the village is a small clump of trees, appearing as a single tree, which is conspicuous from seaward.

From Al Jumail the coast trends about 2 miles south-westward to the head of a bay where the normal high water line is breached at high water springs causing flooding of the low flats inland. From the head of the bay the coast trends sharply north-westward for about a mile to the village of Al Khadaj.

About 1¾ miles west-south-westward of Al Khadaj is the village of Al Khuwair ; the coast of the bay between these villages is low-lying and is also flooded at high water springs.

About 4 cables northward of Al Khuwain village is a rocky islet connected with the mainland at low water. Thence an irregular sandy coastline, with occasional rocky outcrops, trends southward to Hisār Zubārah (*Lat. 25° 59′ N., Long. 51° 02′ E.*).

Ras ‘Ashairiq is low and rocky, with the ruins of a lookout tower on it. A reef extends about one cable from the point, and between it and the reefs extending eastward from Jazīrat Bahrein there are depths of from 2 to 3 fathoms ($3^{m}7$ to $5^{m}5$). Ras ‘Ashairiq is the western entrance point of a shallow bay formed between it and the coast ; the head of this bay is very flat and swampy, showing no definite high water line ; a small rocky islet lies about 1½ miles north-eastward of Ras ‘Ashairiq ; on the eastern side of the bay are the ruins of the town of Zubārah. The shores of the bay and the coast immediately northward of it are sandy and dry for a considerable distance offshore.

About 3 miles eastward of Ras ‘Ashairiq stands, at an elevation of 75 feet ($22^{m}9$), Hisār Zubārah, a conspicuous substantial building with four towers which has recently been rebuilt ; the fort belongs to the Shaikh of Qatar, who resides at Dōha, and is normally locked and barred.

Katat Ekhchejera is a reef, with depths of from one to 6 feet ($0^{m}3$ to $1^{m}8$), on the northern extremity of which is a patch that dries 3 feet ($0^{m}9$), and on the southern end a patch that dries 6 feet ($1^{m}8$). This reef lies about 5 miles west-north-westward of Ras ‘Ashairiq ; the sea breaks over it at low water, and at high water its presence is disclosed by an oily appearance of the surface and slight discoloration.

A rock, with a depth of less than 6 feet ($1^{m}8$) over it, lies about 6 miles northward of Ras ‘Ashairiq.

A white spherical buoy is moored about 8½ miles north-north-westward, and a black spherical buoy about 4½ miles west-north-westward of Ras ‘Ashairiq ; the buoyed channel, farther southward, is referred to below.

Anchorage.—Anchorage may be obtained by vessels with local knowledge, with a draught up to 10 feet ($3^{m}0$), in a depth of 15 feet ($4^{m}6$), about half a mile north-westward of Ras ‘Ashairiq; vessels with a draught of 15 feet ($4^{m}6$) should anchor, in a depth of 19 feet ($5^{m}8$), about 7 miles north-north-westward of the point.

Charts 3790, 2830, 2847.

Coast.—Beacon.—Buoyage.—The ruins of Rubaija lie about 2 miles southward of Ras ‘Ashairiq (*Lat. 25° 59′ N., Long. 51° 00′ E.*) ; thence to Dōhat al Hasain, entered about 20 miles farther southward, there are no signs of habitation ; the greatest depth in this inlet, the

Charts 2837, 2858, 748b.

Charts 3790, 2830, 2847.

inner part of which is named Dōhat Faishshākh, is 2 fathoms ($3^{m}7$), and on its shores are several forts and huts. Jazīrat Hawār is the westernmost and largest of a group of islands on the western side of the entrance to Dōhat al Hasain; a beacon 30 feet ($9^{m}1$) high, stands on the northern part of the western of two islets situated about 2 miles north-north-westward of the northern extremity of Jazīrat Hawār. Ras Aburūk is the northern extremity and Ras as Sauwād, the north-western extremity of a peninsula, the eastern side of which forms the western side of Dōhat al Hasain; the north-western side of this peninsula is reported by the natives to consist of a range of moderately high stony hills.

A channel, marked by black spherical buoys, lies from 2 to 8 miles off the western coast of Al Qatar, and extends south-westward from the vicinity of Ras 'Ashairiq to abreast Jazīrat Hawār. A light-buoy, No. 3, with a conical topmark painted black and white in vertical stripes and exhibiting a *white flashing* light *every six seconds*, is moored in this channel, nearly 3 miles north-westward of the beacon referred to above.

Chart 3790.

Off-lying dangers.—Buoyage.—A shoal, with a depth of 22 feet ($6^{m}7$), lies about 13 miles north-north-westward of Ras Rākān. A vessel of shallow draught can pass between it and Fasht ad Dibal, about 7½ miles south-westward, but those of deep draught should keep northward of it, in depths of not less than 6 fathoms ($11^{m}0$).

Fasht ad Dibal, about 14 miles west-north-westward of Ras Rākān, dries in places, and its northern edge is fairly steep-to. A square coral mound, in the centre of which is a fresh water spring, and which from a distance resembles a small dhow, is situated on the north-eastern edge of this reef; close eastward of it there is a much smaller mound surmounted by a pipe, marking a triangulation station. Local craft shelter from the shamāl off the south-eastern side of the reef. In a good light the reef can be seen at all states of the tide. A detached 11-foot ($3^{m}4$) patch lies about 3 miles westward of its southern end, and a shoal, with depths of from 6 to 18 feet ($1^{m}8$ to $5^{m}5$), extends about 10 miles south-south-westward from Fasht ad Dibal, joining the reefs extending eastward from Jazīrat Bahrein. Katah ad Jaradeh, which dries in places, is separated from the southern end of Fasht ad Dibal by a channel, about 2½ miles wide, with depths of from 15 to 18 feet ($4^{m}6$ to $5^{m}5$) in the fairway. On the south-eastern side of Katah ad Jaradeh there is a narrow strip of sand, the shape and elevation of which depends on the strength of the wind. A beacon pipe, 15 feet ($4^{m}6$) high is situated on the southern extremity of the reef (*Lat. 26° 10′ N., Long. 50° 54′ E.*).

The white spherical buoy, the northernmost of a buoyed channel which runs southward and south-westward and is referred to above, lies about 4½ miles south-south-eastward of the above beacon.

A bank, with depths of less than 18 feet ($5^{m}5$) extends about 7 miles eastward of the beacon on Katah ad Jaradeh; a rock, with a depth of less than 6 feet ($1^{m}8$) over it, lies about 7 miles south-eastward of the same beacon; a similar rock lies about 11½ miles south-south-eastward of the beacon.

About 8 miles south-south-westward of Katah ad Jaradeh is the eastern extremity of the reefs extending about 15 miles or more east-

Charts 2837, 2858, 748b.

Chart 3790.

ward from Jazīrat Bahrein, the whole space within that distance being apparently encumbered with shoals which have not been examined.

Two coral cairns, each 6 feet ($1^{m}8$) high and surmounted by a pipe, stand about 6 and 11 miles southward of Katah ad Jaradeh.

As the west-going tidal stream sets southward in the vicinity of Fasht ad Dibal, vessels should keep well northward of the reef.

Charts 3790, 2830, 2847.

NORTH-EASTERN AND NORTHERN APPROACHES TO BAHREIN HARBOUR.—Light-vessel.—Fog signal.—Dangers.—Lights.—Buoyage.—The edge of the Great Pearl bank (page 165) extends west-north-westward from a position about 40 miles north-eastward of Ras Rākān. Northward of Ras Rākān there are overfalls in places on the bank.

Charts 3790, 3788.

A light-vessel, painted red, with " Bahrein " in white letters on the sides, is moored about 27 miles north-north-westward of Ras Rākān. A light is exhibited, at an elevation of 45 feet ($13^{m}7$), from a black tower amidships. A fog signal is sounded from the light-vessel. This light-vessel is fitted with a radar reflector. *See* sketch facing page 200.

A red conical buoy, with " Watch " in white letters on its sides, is moored about 8 cables west-north-westward of the light-vessel.

The glare of fires in the vicinity of Ras at Tannūra (page 216), Jabal Ummer Rūs (page 211) about 18 miles southward, and Jazīrat as Sitra island may be seen at a distance of 40 miles.

Chart 3788.

Fasht Annaywah and Fasht Naiwat Arragie, with depths, respectively, of 10 and 11 feet ($3^{m}0$ and $3^{m}4$), are the outermost dangers in the northern approach to Bahrein harbour, and lie about 30 and 33 miles north-north-westward, respectively, of Bahrein light-vessel (*Lat. 26° 34′ N., Long. 50° 58′ E.*). There is no visible indication of their presence.

A light is exhibited, at an elevation of 30 feet ($9^{m}1$), from No. 1 black, steel, pile beacon situated on the southern side of Fasht Annaywah ; the light structure is equipped with a radar reflector.

A 24-foot ($7^{m}3$) patch, the position of which is approximate, was reported, in 1948, about 2 miles north-westward of the above-mentioned light-structure.

A bank with a depth of 36 feet ($11^{m}0$) over it, lies about 4 miles south-south-eastward of Fasht Annaywah.

Hair Abu L'Thama, a detached steep-to patch, with a depth of 18 feet ($5^{m}5$) over it, lies about 16 miles south-eastward of Fasht Annaywah.

Hair Abu Amamah, a bank about 16 miles in length with depths of from 32 to 60 feet ($9^{m}7$ to $18^{m}3$) over it, lies about 11 miles south-south-eastward of Fasht Annaywah.

A light-and-whistle-buoy, exhibiting a *white flashing* light *every eight seconds*, is moored on the south-eastern side of Hair Abu Amamah, about 10 miles north-north-westward of Bahrein light-vessel.

For shoals and lights farther westward, *see* pages 213 and 214.

Charts 3788, 3790.

Hair Sh'Taya, an extensive shoal with depths of from 26 to 39 feet

Charts 3788, 3790.

($7^{m}9$ to $11^{m}9$), lies with its shoalest spot about 9 miles westward of Bahrein light-vessel.

A light is exhibited, from No. 31 beacon, situated off the northern edge of Hair Sh'Taya as defined by the 6-fathom ($11^{m}0$) line.

Chart 3790.

Fasht al Jārim is an extensive reef, situated with Ras ash Shāb, its northern extremity, about 15½ miles west-south-westward of No. 3 light-beacon. Its middle and southern parts consist of rock and sand, but on its northern end are black masses of coral ; at its southern end, which is called Jādam, is a large sand bank, on which lie numerous reefs. Kalai'a, a rock which dries 6 feet ($1^{m}8$), lies about 4¼ miles north-north-westward of the southern extremity of the reef. An artificial island, 18 feet ($5^{m}5$) high, composed of rubble, lies on the bank about 1½ miles south-south-eastward of the southern end of Jādam.

Ras ash Shāb is out of sight of land, and caution is therefore necessary when approaching it from northward. Hair al Adhalah, with depths of from 12 to 18 feet ($3^{m}7$ to $5^{m}5$), extends about 2½ miles north-westward from the northern end of Fasht al Jāram. For light northward of Hair al Adhalah, *see* page 219.

A flat, with depths of less than 18 feet ($5^{m}5$), extends about 6 miles off the eastern side of Fasht al Jāram and about 2½ miles south-south-eastward from its southern extremity.

Ras al Ain is a detached reef lying about half a mile off the southern part of the eastern side of Fasht al Jārim.

Chart 3792.

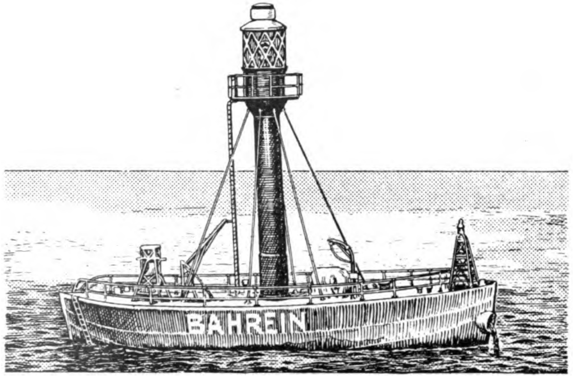
A rock, with a depth of less than 6 feet ($1^{m}8$), lies about 2½ miles east-south-eastward, and a 6-foot ($1^{m}8$) patch lies 1¼ miles east-north-eastward of Ras al Ain (*Lat. 26° 24′ N., Long. 50° 32′ E.*).

Jazīrat Muharraq.—Dangers.—Lights.—Beacon.—This island, situated north-eastward of Jazīrat Bahrein, and separated from it by a narrow channel, which leads to Khōr Kaliya (page 206), is low and sandy ; on it are several prominent groves of date palms, about 65 feet ($19^{m}8$) high, which are the first objects sighted when approaching, though in very clear weather, Jabal ad Dukhkhān (chart 3790) (page 201), will be visible just before them.

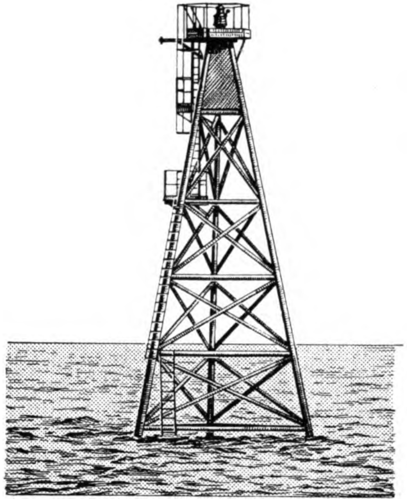
Qalāli is a village on the north-eastern extremity of the island, in which there are several small towers, the easternmost being the largest. Samāhij, Dair and Busaitīn are villages with date groves, on the northern and western coasts of the island. *Red* obstruction lights, for the use of aircraft, are exhibited from seven of a group of eleven radio masts, varying from 70 to 90 feet ($21^{m}3$ to $27^{m}4$) in height, situated near the coast between Qalāli and Samāhij. Near the northern extremity of the island is Raiya, where there is a clump of date palms, which can be identified from north-eastward by two white buildings close westward of it. *See* view facing page 201.

Reefs fringe the island, extending as much as 2 miles offshore in places. A shallow flat, with depths of less than 18 feet ($5^{m}5$) over it, extends about 4 miles north-westward, 2½ miles northward, and 3 miles eastward from the coasts of the island. Ras Khasaifa spit is the north-western extremity of these flats. Dara shoal, with a least depth of 17 feet ($5^{m}2$) over it, lies in the channel between Ras Khasaifa spit and the shoal flat extending south-south-eastward from Fasht

To face page 200.

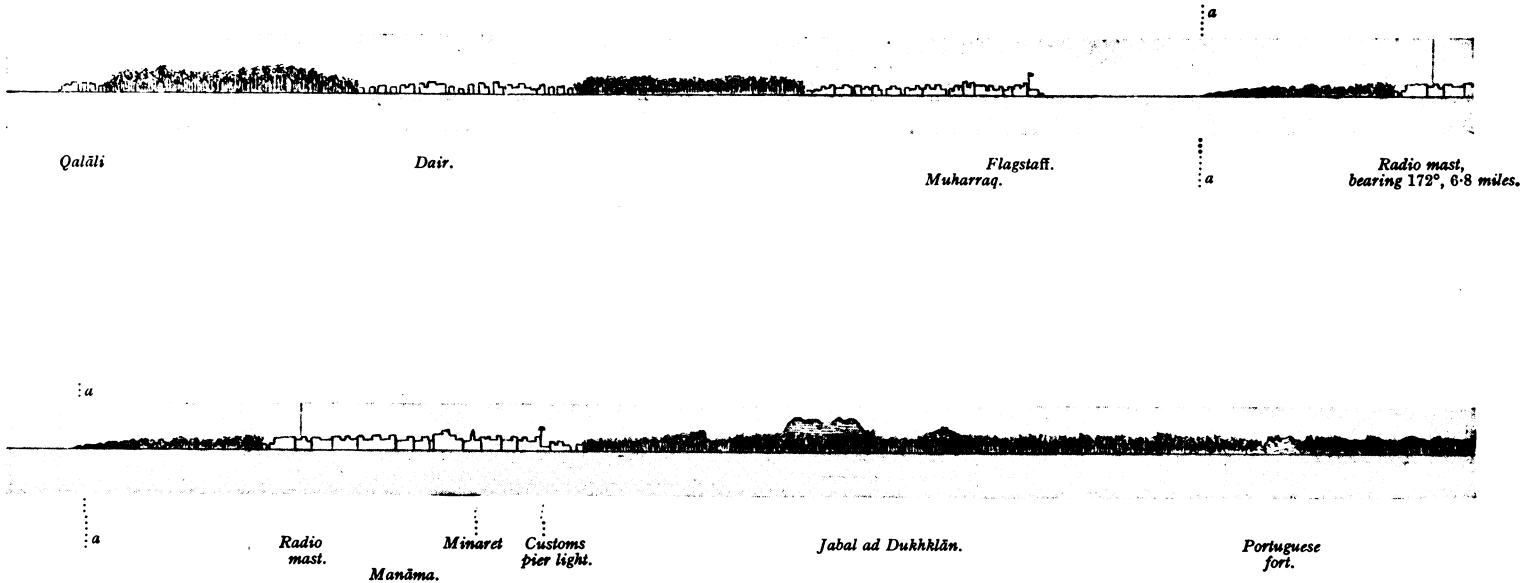


Bahrein Light-vessel.



South Sitra Light-beacon.

(*Originals dated* 1954.)



View, in two parts, of the northern approach to Bahrein harbour.

(*Original dated* 1933.)

Chart 3792.

al Jārim ; a black conical buoy marks its north-western extremity. Jazīrat Khasaifa, 8 feet (2^{m}4) high, lies on the reef 3½ cables from the northern side of Jazīrat Muharraq. Fasht al Hadba is the north-western extremity of the reef extending from the north-western side of the island. Jazīrat as Sāja, about 2 feet (0^{m}6) high, lies on the reef about 8 cables westward of Busaitīn. A white pole beacon, 35 feet (10^{m}7) in height, surmounted by a cylinder, stands on Jazīrat as Sāja.

Chart 3789, Khōr Kaliya and Sitra anchorage.

Muharraq, a large town with an entirely native population, is situated on the south-western extremity of the island. There is a boat pier at the town which is available at all states of the tide, but elsewhere landing is only possible when the tide is above mean sea level. There is a quarantine station close to Abu Māhur (*see* below), where there is a jetty.

Two lights, vertically disposed, are exhibited from a conspicuous flagstaff at the inner end of the pier (*Lat. 26° 15′ N., Long. 50° 37′ E.*).

Abu Māhur is a square fort with one large and three small towers, conspicuous from the anchorage in Bahrein harbour, situated at the southern end of the town ; it stands on a low detached bank which becomes an islet at high water.

For details of an obstruction which lies southward of the above fort, *see* page 209.

Al Hadd, a town situated on the south-eastern extremity of Jazīrat Muharraq, shows up well from eastward. A reef, which forms the eastern side of Khōr Kaliya (page 206), extends about 3¼ miles southward from the town.

About midway between the towns of Muharraq and Al Hadd is the peninsula of Arād, on the south-western part of which are a ruined fort, 28 feet (8^{m}5) high, a date grove, and a large white house.

Chart 3792.

There is a landing ground for aircraft about 1½ miles north-eastward of Muharraq town.

Charts 3792, 3790.

Jazīrat Bahrein.—Dangers.—The coasts of Jazīrat Bahrein are low, and along its northern end is a belt of fertile land covered with date groves and lucerne ; the remainder of the island is uncultivated.

From about 4 miles southward of the northern coast, a rocky tableland, from 100 to 150 feet (30^{m}2 to 45^{m}7) high, extends southward for many miles and stretches across the island almost from side to side ; the tableland rises on all sides in small cliffs.

Rifā ash Sharqi, a village about 7 miles southward of the north-eastern extremity of the island, stands partly on, and partly at the foot of the cliffs on the north-eastern side of the tableland ; at the village (*Lat. 26° 07′ N., Long. 50° 34′ E.*) is a hill fort with several towers, which attain an elevation of about 210 feet (64^{m}0) and from northward are visible over the tree tops from seaward, though at times, owing to the growth of the trees they are difficult to identify even from aloft.

Jabal ad Dukhkhān, about 12 miles from the northern end of the island and about midway between its eastern and western coasts, is a small compact group of dark hills, which rise to an elevation of 410 feet (125^{m}0) ; in clear weather it is the first part of the island to be

Charts 3792, 3790.

sighted when approaching it. The rig of an oil well was, in 1954, prominent from north-eastward. *See* view facing page 201.

Charts 3789, plan of Bahrein harbour, 3792.

Ras ar Rummān, the north-eastern extremity of the island and on which stands the town of Manāma (page 205), is situated about 1½ miles south-westward of Muharraq. A conspicuous minaret is situated about 3½ cables west-south-westward, and another about 6½ cables south-south-westward of Ras ar Rummān. A conspicuous radio mast, from which a *red* light is exhibited for the use of aircraft, is situated about half a mile eastward of the latter minaret. About 2¾ miles south-westward of Ras ar Rummān are the ruins of a large mosque with two minarets, each about 70 feet ($21^{m}3$) high, the upper parts of which are visible over the tree tops until near the inner harbour and are good marks though not easily identified. About midway between the ruins of the mosque and the radio mast just described, are the four conspicuous masts of the radio direction finding station.

Chart 3792.

The old Portuguese fort about 3½ miles westward of Ras ar Rummān, stands in ruins about 60 feet ($18^{m}3$) in height, in a gap in the date groves, about three-quarters of a cable from the beach and is little better than a heap of stones ; from seaward, it appears as a shapeless light coloured mass ; it shows up in the early morning sunshine, but is difficult to distinguish when the sun is behind it. It is known among the villages in the vicinity as Qal'at al 'Ajāj, and in the town of Manāma as Qal'at al Farangi. About 2½ miles westward of the fort is the village of Sharaiba, where there is a solitary palm tree.

Budai'a is a town standing on the north-western extremity of Jazīrat Bahrein.

The northern coast of Jazīrat Bahrein is fringed with reefs which dry, extending from half a mile to 2½ miles offshore. Liya, about 1¾ miles northward of the Portuguese fort, is a rock which dries 3 feet ($0^{m}9$), lying on a spit, with depths of less than 18 feet ($5^{m}5$), which extends nearly 2½ miles northward from the coast. Lighthouse rock, about 2 feet ($0^{m}6$) high, lies on the edge of the reefs about 8½ cables northward of the Portuguese fort ; it is not conspicuous, being almost hidden by fishing stakes.

Sala is a detached reef, which dries, about 2½ miles north-westward of Sharaiba (*Lat. 26° 14' N., Long. 50° 28' E.*) ; there are several shoals in its vicinity and the depths are very irregular. About 2½ miles northward of Sala is Marwadi, a reef which dries about 6 feet ($1^{m}8$) ; at high water, when it is just covered, if about mid-day, it is difficult to distinguish, though its presence is usually disclosed by the birds on it.

West spit is the south-eastern extremity of a shoal, which, with depths of from 10 to 18 feet ($3^{m}0$ to $5^{m}5$), extends about 4¾ miles south-eastward, into Bahrein harbour, from Marwadi ; the shoal also extends about 1½ miles south-westward from Marwadi.

Charts 3792, 3790.

Khōr Fasht, a coral reef on which there are two or three sandbanks which dry 3 or 4 feet ($0^{m}9$ or $1^{m}2$), lies with its south-eastern extremity about one mile northward of Marwadi and about 3 miles south-westward of Jādam. Its eastern edge usually shows up plainly, but it is reported that it is very difficult to distinguish the reef at high water when that occurs about mid-day.

Charts 2847, 2837, 2858, 748b.

Charts 3792, 3790.

A narrow channel, with a least depth of 16 feet ($4^{m}9$) in the fairway, separates Marwadi from Khōr Fasht.

Hair ar 'Regah is an extensive sand bank, the extent of which has not been determined, separated from the south-western side of Khōr Fasht by a channel 4 cables wide, with a least depth of 20 feet ($6^{m}1$). On it lie numerous shoals and coral heads.

Chart 3789, plan of Bahrein harbour, 3792.

BAHREIN HARBOUR AND EASTERN APPROACH.—Light.—Light-buoys.—Dangers.—Bahrein harbour lies northward of Jazīrat Bahrein, and is entered between Ras Khasaifa spit, south-eastward, and the shoal flat extending south-eastward from Jādam. Although Fasht al Jārim affords shelter from the shamāl it does not prevent a considerable sea getting up in the outer harbour when the wind is strong ; communication, however, with the shore is seldom interrupted, and vessels ride easily at their anchor.

A light is exhibited, at an elevation of 19 feet ($5^{m}8$), from a stone structure, painted black and white in horizontal bands, situated on Ras Zurawen. *See* below.

North Sitra conical light-buoy, painted black and exhibiting a *white flashing* light, *every twelve seconds*, is moored about 12 miles east-north-eastward of Jazīrat Khasaifa.

The outer conical light-buoy, painted black and white in vertical stripes and exhibiting a *white group flashing* light, showing *two* flashes *every thirteen seconds*, is moored on the north-western side of the fairway about 6 miles north-eastward of Jazīrat Khasaifa.

Middle Sitra conical light-buoy, painted red and white in vertical stripes and exhibiting a *white flashing* light *every one-and-a-half seconds*, is moored about 7¾ miles east-south-eastward of Jazīrat Khasaifa. A 34-foot ($10^{m}4$) patch lies about one mile east-south-eastward, and depths of 31 feet ($9^{m}4$) lie about 2¼ miles south-south-eastward of this light-buoy.

Chart 3789, plan of Bahrein harbour.

The inner can light-buoy, painted red and black in horizontal bands, and exhibiting a *white flashing* light, *every twelve-and-a-half seconds*, is moored in the approach to the harbour, about 5 miles north-westward of Jazīrat Khasaifa. Vessels should pass northward and westward of this light-buoy.

Fasht Rustan is a reef, westward of those extending from Muharraq island, lying about 2 miles north-north-westward of Ras ar Rummān.

Ras Zurawen on the eastern side of the inner harbour, about 1¾ miles north-westward of Ras ar Rummān (*Lat. 26° 14′ N., Long. 50° 35′ E.*). is the western extremity of the reefs extending north-north-westward from that point.

A conical light-buoy, painted red, and exhibiting a *white flashing* light *every seven seconds*, marks the eastern extremity of West spit, about 2 miles north-north-westward of Ras Zurawen light structure.

The inner harbour is a bight in the reefs west-north-westward of Manāma affording much better shelter than the outer harbour ; it is suitable for small craft and is usually full of bāgalas, but vessels with a draught of more than 13 feet ($4^{m}0$) should not enter. The reefs bordering the inner harbour are all flat and in a good light they show up well ; there are numerous fish weirs on them, but with a

Chart 3789, plan of Bahrein harbour.

few exceptions, they are all a considerable distance inside the edge of the reef. Discoloured water often extends westward of Jazīrat Khasaifa, across the harbour.

The least depth in the fairway from seaward into the outer harbour is 20 feet ($6^{m}1$), and thence into the inner harbour, 15 feet ($4^{m}6$).

Anchorages.—A vessel may obtain anchorage in the outer harbour close westward of the leading line (*see* below), in depths of from 23 to 30 feet ($7^{m}0$ to $9^{m}1$), with the northern extremity of Muharraq island bearing between 085° and 090°.

A vessel drawing 15 feet ($4^{m}6$) may anchor close eastward of the leading line, with Ras Zurawen light structure in line with the conspicuous flagstaff on the pier at Muharraq, bearing 095°, over a bottom of sand and mud. If Jabal ad Dukhkhān cannot be seen she should anchor when the light standard on the Customs pier bears 132°. Vessels with a draught of less than 13 feet ($4^{m}0$) may anchor in the inner anchorage with Ras Zurawen light structure bearing 000°, distant half a mile, over a bottom of sand and mud.

Good anchorage, completely sheltered from the shamāl, may be obtained eastward of Jādam.

Charts 3792, 3790, 2847.

Directions.—A vessel approaching Bahrein harbour should keep a good lookout from aloft for shoals. The 10-fathom ($18^{m}3$) line about 25 miles north-eastward of Jazīrat Khasaifa in the vicinity of Bahrein light-vessel, is a good guide. During the summer months the sand-haze renders it, at times, difficult to pick up the light-vessel, but at other times it is often sighted before it is expected owing to mirage. During spring and autumn early morning fog or thick mist may render it advisable to make the light-vessel at night rather than in the early morning. During the pearl-fishing season, a great number of dhows anchor on the banks in the vicinity of the light-vessel, rendering caution necessary at night ; these vessels, however, will indicate the direction and strength of the tidal stream.

Should a vessel approaching the harbour be set southward of the fairway, the clumps of date palms on Jazīrat Muharraq, Qalāli village, the town of Al Hadd, Jabal ad Dukhkhān and Rifā' ash Sharqi village, should be seen in time to ascertain the position in safety. If these objects cannot be distinguished, the 6-fathom ($11^{m}0$) line gives ample warning of shoal depths, with the exception of two positions, eastward of Al Hadd (*Lat. 26° 14' N., Long. 50° 39' E.*) and eastward of Kassār Diwan (page 207), in which positions there are depths of less than 18 feet ($5^{m}5$) 3 cables and a half a cable, respectively, inside the 6-fathom ($11^{m}0$) line.

The edge of Fasht al Jārim is usually indicated by the pale green colour of the sea, especially in the early morning. The tidal streams set eastward and westward in the approach to Bahrein harbour.

In clear weather, as Jazīrat Bahrein is approached, Jabal ad Dukhkhān may be sighted from a distance of about 25 miles ; at about the same time the radio masts at Manāma and those about 1¼ miles south-westward will come into sight, and subsequently the date palms at Raiya and the northernmost clumps of trees on Jazīrat Muharraq will appear.

On nearer approach from north-eastward, should the light-vessel be adrift or out of position, Jabal ad Dukhkhān, bearing about 208°,

Charts 2837, 2858, 748b.

Charts 3792, 3790, 2847.

or the clump of date palms at Raiya, bearing about 232°, will lead in depths of 5 fathoms (9^{m}1), until the tower at Qalāli and the remaining clumps of date palms on Jazīrat Muharraq can be seen, and the position of the vessel fixed approximately.

Having passed the light-vessel, a least depth of 22 feet (6^{m}7) may be assured by steering for the outer light-buoy and thence steering to pass close on either side of the inner light-buoy. Thence she should steer 208° for about 13½ cables, passing about half a cable westward of Dara shoal black conical buoy. When West Spit light-buoy bears 191°, the vessel may steer for the anchorage as previously directed. *See* view facing page 201.

If these leading marks cannot be distinguished, the vessel should steer for the old Portuguese fort, bearing about 195°, until Jazīrat Khasaifa bears about 105°, when she may proceed to the anchorage as previously directed. The minarets, which are difficult to distinguish, appear as two pointed towers showing just above the tops of the trees ; they become obscured by the trees as the inner harbour is approached.

As the buoys have been reported to be unreliable, the position of the ship should be fixed frequently, until the leading line mentioned above can be seen, great care should be taken to avoid the outlying patches of less than 18 feet (5^{m}5) lying about 6 miles north-eastward, 5½ miles northward and 4½ miles north-westward of Jazīrat Khasaifa. A number of detached patches, with depths of less than 18 feet (5^{m}5), lie off the edge of the coastal bank within 3 miles northward of Jazīrat Khasaifa.

The tidal stream, which sets north-eastward across the entrance of the inner harbour, is appreciable, and caution is therefore necessary on that account also. The closer in that a vessel is able to anchor the less is the sea that will be felt during a shamāl.

For tidal streams in the entrance to the outer harbour, *see* page 221.

Charts 3792, 3789, plan of Bahrein harbour.

Manāma.—Lights.—Beacon.—This, the principal town and port of Jazīrat Bahrein, is situated on Ras ar Rummān. In 1954, it was estimated to have a population of about 40,000. The old British Political Agency, with its flagstaff, stands about 1½ cables west-south-westward of the point. The radio station, with its mast, which latter is conspicuous and 210 feet (64^{m}0) high, is situated about half a mile south-south-eastward of the point. A light for the use of aircraft is occasionally exhibited from the top of this mast.

A stone pier extends north-north-westward from a position close eastward of the old British Political Agency. A black and white pole beacon stands on the head of this pier, from which a light is occasionally exhibited. The steps of the pier dry 2 feet (0^{m}6). Boats' crews should be warned against wading with bare feet, as the coral is sharp, and cuts caused by it are liable to be poisoned.

The Customs pier is situated about 6 cables west-south-westward of Ras ar Rummān (*Lat. 26° 14′ N., Long. 50° 36′ E.*). There is a depth of 5 feet (1^{m}5) at the head of this pier, but at very low tides there is a depth of only 9 inches (0^{m}2) alongside it. A shorter pier lies about 500 feet (152^{m}4) eastward of the Customs pier.

A light is occasionally exhibited, at an elevation of 83 feet (25^{m}3), from a conspicuous black, iron, framework beacon situated about half-way along the Customs pier.

Charts 2837, 2858, 748b.

Charts 3792, 3789, plan of Bahrein harbour.

Another shorter pier was, in 1954, under construction about 500 feet (152^{m}4) eastward of the Customs pier.

Two minarets, situated about 3½ cables west-south-westward and 5 cables south-south-westward, respectively, of the British Political Agency, and four masts of the R.D.F. station, about 8 cables south-westward of the latter minaret, are conspicuous. *See* view facing page 201.

The Shaikh's palace, which has a dome, is situated about one mile southward of Ras ar Rummān. For light *see* page 209.

A new palace, with a conspicuous dome, has been constructed (1954) about 3¾ cables south-eastward of the Shaikh's palace.

Pilots.—Native pilots usually proceed to a vessel when she is observed approaching the harbour.

Port facilities.—Fresh meat and bread are plentiful, but vegetables are scarce. Water may be obtained from tank boats ; the supply is unlimited, but the water is brackish.

The Customs pier is equipped with a 4-ton hand crane.

There are several hospitals.

Trade.—The principal exports are oil, pearls, wood fuel, rope, hides and skins, dried fish and dates ; the chief imports are cotton goods, tinned foods, hardware, cutlery and cement.

Communications.—There is regular steamer communication with the principal ports in the Persian gulf.

There is communication by air with Great Britain, India and Australia.

Radio stations.—There is a radio station and a radio direction finding station at Manāma (*Lat. 26° 14′ N., Long. 50° 35′ E.*). *See* page 18. In 1955, the Radio direction finding service was suspended.

Climate and health.—The climate in Bahrein harbour is unpleasant from April until October, being very hot with a high relative humidity ; it is stated, however, to be better than any of the other ports on the Arabian coast of the gulf. Very pleasant weather is experienced from November to March.

In June and July, the shamāl is often strong enough to make the weather relatively cool and pleasant.

Manāma is more liable to epidemics than the smaller ports; since 1920, however, there have been no more epidemics in Bahrain than in any other of the larger Gulf ports. It is fairly free from insect pests.

The endemic diseases are : smallpox, the enteric group of fevers ; dysentery, both amoebic and bacillary ; malaria ; and all kinds of venereal disease. Europeans, however, are seldom attacked if they observe the usual precautions.

The epidemic diseases are plague and cholera. The former is always imported from India, either directly or through intermediate ports ; since 1920, epidemics of this disease have arisen at intervals of 5 years, but under steadily improving quarantine supervision they should tend to become still less frequent. Cholera is imported, usually, from 'Iraq; Bahrein is, however, less frequently attacked than any other of the Gulf ports, and this is probably due to the fact that the water supply is less open to contamination.

Charts 3792, 3789, plan of Khōr Kaliya and Sitra anchorage.

KHŌR KALIYA AND APPROACHES.—Dangers.—Beacons.—Lights.—Buoyage.—This extensive inlet lies eastward of the

Charts 3790, 2847, 2837, 2858, 748b.

northern end of Jazīrat Bahrein, and southward of Jazīrat Muharraq ; it is enclosed on its eastern and southern sides by reefs extending, respectively, southward and eastward from Jazīrat Muharraq and Jazīrat Bahrein. The only entrance available to shipping is at its south-eastern corner ; but there is a boat passage, with a depth of one foot ($0^{m}3$), the entrance to which lies between Fasht Rustan and Jazīrat as Sāja, (*Lat. 26° 16′ N., Long. 50° 36′ E.*), leading into its north-western corner.

Chart 3789, plan of Khōr Kaliya and Sitra anchorage.

A causeway crosses the north-western end of the inlet between Manāma and Muharraq, in which there is a swing bridge over the deepest part of the channel. This bridge is open daily from 1100 to 1200 hours and from 2300 to 2400 hours, local time.

The middle of the inlet is occupied by an extensive shoal, with depths of from 7 to 18 feet ($2^{m}1$ to $5^{m}5$), sand, but there is a considerable area around the shoal which affords good anchorage, sheltered from the shamāl.

Kassār Diwan is a rock, about one foot ($0^{m}3$) high, lying on the southern extremity of the reef which extends about 3¼ miles southward from the town of Al Hadd (page 201).

Bar beacon, a pyramid on three legs, about 11 feet ($3^{m}4$) high, stands about 2½ cables south-south-westward of Kassār Diwan.

A light is exhibited, at an elevation of 49 feet ($14^{m}9$), from South Sitra beacon, a conical framework tower 45 feet ($13^{m}7$), is situated at the south-eastern extremity of the shoal bank which extends eastward from Jazīrat Muharraq, about 3 miles eastward of Kassār Diwan. *See* sketch facing page 200.

A light is exhibited, at an elevation of 23 feet ($7^{m}0$), from South Shoals beacon, a black framework pile structure 12 feet ($3^{m}7$) in height, with a black square topmark, situated about 14 cables south-westward of South Sitra light-beacon, and marks the northern side of the shoal bank which extends south-eastward from Jazīrat as Sitra (*see* below).

A light is exhibited, from South Range beacon, a pile structure 12 feet ($3^{m}7$) in height, situated about 13½ cables westward of South Shoals light-beacon.

A shoal, over which there is a least depth of 11 feet ($3^{m}4$), lies just outside the entrance ; but deep channels on either side of it lead up to the bar. A conical light-buoy, painted black and white in horizontal bands, surmounted by a cone and exhibiting a *white flashing* light *every two seconds*, is moored off the south-eastern extremity of this shoal about one mile south-eastward of Kassār Diwan.

A light is exhibited from North Range beacon, a pile structure, 18 feet ($5^{m}5$) in height, situated about 6½ cables north-north-westward of South Range light-beacon (*Lat. 26° 10′ N., Long. 50° 40′ E.*).

Two oil wharves are situated about 1¼ miles south-south-eastward of Kassār Diwan. No. 1 wharf, an **H**-shaped detached pile structure, to which submerged pipe lines from the shore are connected, provides two berths, one on each side, with depths of from 34 to 40 feet ($10^{m}4$ to $12^{m}2$) alongside, at which vessels lie with bow and stern secured to mooring buoys. No. 2 wharf, constructed of steel and timber, is connected by a causeway, nearly 2½ miles in length, with As Sitra ; it provides berths for four large vessels and has depths of from 34 to 40 feet ($10^{m}4$ to $12^{m}2$) alongside. Tugs are available to assist vessels

Chart 3789, plan of Khōr Kaliya and Sitra anchorage.

to berth. With strong northerly winds small vessels cannot lie comfortably alongside No. 1 wharf.

Lights are exhibited, at heights of 50 feet (15^{m}2) above the wharves, from No. 1 oil wharf and from the north-western and south-eastern heads of No. 2 oil wharf.

Triad beacon, a white, stone, truncated cone surmounted by a staff and ball, is situated on the western side of the channel about 4 cables north-westward of Kassār Diwan. This beacon is the most readily distinguishable daymark in the approach to Bahrein.

A conical light-buoy, painted black and white in horizontal bands, surmounted by a cone and exhibiting a *green flashing* light *every two seconds*, is moored about 5 cables northward of Triad beacon.

A black spherical buoy is moored about 2¼ cables north-westward and a red can buoy is moored about 4¾ cables west-north-westward of Triad beacon.

The entrance channel across the middle of the bar, over which there is a least depth of 12 feet (3^{m}7) situated close southward of the Bar beacon, is about 60 yards (54^{m}9) wide ; it shoals abruptly on its south-eastern side and gradually on its north-western side. Southward of the entrance are the reefs which extend from the whole of the eastern side of Jazīrat Bahrein towards Ras 'Ashairiq (*see* page 196).

Charts 3789, plan of Khōr Kaliya and Sitra anchorage, 3792, 3790.

Jazīrat as Sitra is situated with its north-eastern extremity about 2¼ miles west-south-westward of Kassār Diwan ; a wooden bridge spans the narrow channel, part of which dries, between Jazīrat as Sitra and Jazīrat Bahrein. The northern half of the island is covered with high date palms, amongst which is Sitra village and its fort. Mahāna as Saghira is a small village at the southern end of Jazīrat as Sitra ; there is a wide and deep channel about half a mile eastward of the village, which leads southward, but it has not been examined. About 1¼ miles south-westward of Mahāna as Saghira is Mahāna al Kabira, on Jazīrat Bahrein.

Two light-buoys, Nos. 12 and 11, with conical topmarks painted black and white in vertical stripes, are moored off the southern entrance to the narrow channel between Jazīrat Sitra and Jazīrat Bahrein ; No. 12, which exhibits a *green flashing* light *every three seconds*, lies about 3¼ miles south-south-westward of South Range light-beacon. No. 11, which exhibits a *white flashing* light *every four seconds*, is moored about three-quarters of a mile farther south-south-westward.

No. 10 black spherical buoy is moored about 1¼ miles off the eastern coast of Jazīrat Bahrein, about 4½ miles southward of the southern end of Jazīrat as Sitra.

Chart 3789, plan of Khōr Kaliya and Sitra anchorage.

Ras al Jasra, on which there is a village, a flagstaff, 73 feet (22^{m}3) high, and a detached date grove, lies about 2 miles northward of the northern extremity of Jazīrat as Sitra. A chimney stands near the coast, about 2½ cables south-westward of the flagstaff (*Lat. 26° 12'°N., Long. 50° 37' E.*).

Red obstruction lights, for the use of aircraft, are exhibited from each of six radio masts situated south-eastward of the flagstaff on Ras al Jasra ; similar lights are exhibited from each of three radio masts, 180 feet (54^{m}9) high, situated about three-quarters of a mile west-south-westward of the same flagstaff.

Charts 2847, 2837, 2858, 748b.

Chart 3789, plan of Khōr Kaliya and Sitra anchorage.

A pier, with a depth of about 5 feet ($1^{m}5$) at its head, extends about 2¾ cables south-south-eastward from a position about 3½ cables south-south-westward of Ras al Jasra.

A shoal, with a depth of one foot ($0^{m}3$), lies about 6½ cables east-south-eastward of the flagstaff on Ras al Jasra ; it is marked by Shoreham beacon.

Several mooring buoys lie within half a mile southward of Shoreham beacon.

Chart 3789, plan of Khōr Kaliya and Sitra anchorage, 3792.

Khōr Lupin opens into the south-western corner of Khōr Kaliya southward of Ras al Jasra and is an extensive shallow backwater, with depths of from one foot to 11 feet ($3^{m}4$), but there is no clear passage into it. The best entrance is northward of Jazīrat Nebi Saleh, about 1¾ miles south-westward of Ras al Jasra, where a depth of 6 feet ($1^{m}8$) may be obtained at high water. Owing, however, to the existence of many fish traps in the entrance, navigation into Khōr Lupin is not feasible. Jazīrat Nebi Saleh is covered with date palms, and lies on the south-western part of the middle reef in Khōr Lupin.

Chart 3789, plan of Khōr Kaliya and Sitra anchorage.

There are two detached coral patches, with depths of one and 6 feet ($0^{m}3$ to $1^{m}8$), situated, respectively, about 7 cables northward and 9½ cables north-north-westward of the flagstaff on Ras al Jasra (*Lat. 26° 12′ N., Long. 50° 37′ E.*).

An aircraft landing area is indicated on the chart between the above coral patches and the reef which extends north-eastward from Ras al Jasra ; two red can buoys, moored one at each end of the one-foot ($0^{m}3$) detached patch, mark the north-eastern side of the landing area ; four similar buoys, moored along the edge of the shoal water north-eastward of Ras al Jasra, mark the south-western side of the area. When night-landing operations are in progress a flare-path, consisting of conical light-buoys exhibiting ***white fixed*** lights, is laid in the area ; the flare-path occasionally remains laid by day.

Two beacons, Nos. 5 and 7, stand north-westward of the landing area near the edge of the shoal water, within half a mile eastward of Ras an Nannas (*see* below).

A light is occasionally exhibited from the Shaikh's palace (page 206).

A pier, with a depth of about 5 feet ($1^{m}5$) at the steps at its head, extends about 2¼ cables eastward from a position about 4¼ cables north-eastward of the Shaikh's palace; it is a good landing place. Two mooring buoys lie off the head of this pier.

Ras an Nannas, on which there is a village, is a low sandy point, situated three-quarters of a mile north-north-eastward of the Shaikh's palace. There is a small jetty close southward of the point.

Obstruction.—Mooring buoys.—A submerged pipe, for the supply of fresh water to boats and launches, exists on the eastern side of the channel, about 6½ cables south-south-eastward of Abu Māhur fort (page 201), at the south-western extremity of Jazīrat Muharraq. The pipe, which constitutes an obstruction, is protected by a square wooden anchored fender ; three red spherical mooring buoys lie close to the fender.

Anchorages.—The best anchorage in Khōr Kaliya is about 1½ miles within its entrance, between the middle sand bank and the

Charts 3790, 2847, 2837, 2858, 748b.

Chart 3789, plan of Khōr Kaliya and Sitra anchorage.

eastern reef, in depths of from 24 to 28 feet ($7^{m}3$ to $8^{m}5$). The inlet is frequented by native craft, but these vessels proceed to its head and anchor close off the town of Muharraq.

Warships usually anchor on the western side of the middle ground within Khōr Kaliya, off Ras al Jasra (*Lat. 26° 12′ N., Long. 50° 37′ E.*).

A hut, on an islet 3 feet ($0^{m}9$) high, situated close off the north-western extremity of As Sitra forms a useful anchorage mark.

Sitra anchorage, situated south-eastward of Khōr Kaliya, affords good anchorage in depths of from 7 to 9 fathoms ($12^{m}8$ to $16^{m}5$), with fair shelter from the prevailing winds.

Chart 3790.

An **F**-shaped concrete jetty, with a depth of 4 feet ($1^{m}2$) at its head, extends from the south-eastern side of Jazīrat as Sitra, about three-quarters of a mile southward of the root of the causeway leading to No. 2 oil wharf; about 6 cables farther southward, there is another concrete jetty with a **T**-head, alongside which there is a depth of 10 feet ($3^{m}0$).

About 7 cables south-westward of the southern end of Jazīrat as Sitra, and situated on Jazīrat Bahrein, there is a concrete jetty extending about 4 cables south-eastward, with a depth of 12 feet ($3^{m}7$) at its head.

Charts 3790, 3792 and 3789.

Directions.—From Bahrein light-vessel, a vessel bound for Sitra anchorage should steer to pass south-eastward of North and Middle Sitra light-buoys and South Sitra light-beacon, and thence westward towards the light-buoy marking the south-eastern end of the middle ground off the entrance to Khōr Kaliya. A vessel entering Khōr Kaliya should leave the middle ground buoy to starboard and steer for the tall radio mast in Manāma, bearing about 310° and open south-westward of Bar beacon ; when within 2½ cables of the beacon, she should steer to pass at least 40 feet ($12^{m}2$) westward of it on account of the sunken remains of an old beacon ; thence she should pass eastward of Triad beacon and the black spherical buoy, and close westward of the black and white striped conical light-buoy, whence course may be shaped for the anchorage.

Tidal streams.—The tidal streams run at great strength in the entrance to Khōr Kaliya, setting north-westward with the rising tide and south-eastward with the falling tide and attain a rate of 5 knots, or more, at springs.

Vessels should enter within about half an hour of high water which is the only period when the stream is relatively slack. The entrance can safely be used by vessels drawing up to 15 feet ($4^{m}6$).

Within Khōr Kaliya the tidal streams run at a rate of about half a knot.

Charts 3790, 2847.

DŌHAT AS SALWA AND APPROACHES.—Western side of Jazīrat Bahrein.—Coast.—Dangers.—On the western coast of Jazīrat Bahrein the date palms, instead of being continuous, as on the northern coast, grow in clumps. Reefs and shallow banks fringe the coast and extend from 4 to 4½ miles offshore for some distance southward of Budai‘a (page 202), situated on the north-western point, rendering approach, except in small native craft, impossible.

Charts 2837, 2858, 748b.

Chart 3790.

Jazīrat ar Raqah, 5 feet ($1^{m}5$) high and covered with scrub, lies one mile south-westward of Budai'a, and Jazīrat Jidi, lies about 1¼ miles westward of Jazīrat ar Raqah ; its western end is a cliff, 52 feet ($15^{m}8$) high, but its eastern end is low and sandy.

Jazīrat Umm Na'sān, the northern end of which is situated about one mile southward of Jazīrat Jidi, is low and sandy, but on it are two rocky peaks ; the one, rising to an elevation of 66 feet ($20^{m}1$) about half a mile within the western point of the island, is remarkable ; the other, about half a mile farther north-eastward, is 25 feet ($7^{m}6$) high. The reef on which these islands lie extends about 1¼ miles westward from Jazīrat Jidi (*Lat. 26° 12′ N., Long. 50° 24′ E.*) and about three-quarters of a mile westward and southward from the western part of Jazīrat Umm Na'sān.

Az Zallāq is a small pearling village about 10 miles southward of Budai'ā. Anchorage may be obtained off this village, in a depth of 5 fathoms ($9^{m}1$), about 2¼ miles offshore, with the higher peak of Jazīrat Umm Na'sen bearing 335° ; the anchorage should be approached with the village bearing about 081° ; the depths decrease suddenly from 5 to 3 fathoms ($9^{m}1$ to $5^{m}5$).

Landing is good at Az Zallāq, but bad both northward and southward of it.

Charts 3700, 2847.

Southward of Az Zallāq, all cultivation and date palms cease, the country becoming a stony desert with small patches of camel grass and scrub in places. Shoals extend a considerable distance offshore.

Chart 2847.

Ras al Bar, the southern extremity of Jazīrat Bahrein, is a long low sandy point, which cannot be approached within about 5 miles on account of the shallow flats. Eastward and northward of the point the extensive reef fringing the eastern coast of the island debars all communication except in small boats.

Chart 3790.

Coast westward of Jazīrat Bahrein.—Ras Kuwakib is situated on the mainland of Nejd about 15 miles north-westward of the north-western extremity of Jazīrat Bahrein. Qal'at al Husain is a small fort, close to Ras Kuwakib (*Lat. 26° 21′ N., Long. 50° 13′ E.*).

A reef extends about 8 miles eastward and 7 miles north-eastward from Ras Kuwakib, and near its outer edge are sand banks, which dry, *see* page 213.

Jabal Umm er Rūs, about 5½ miles south-westward of Ras Kuwakib, is the prominent south-eastern summit of a range of hills ; it is a long sloping hill from the middle of which rises abruptly a remarkable and rather flat-topped peak, 300 feet ($91^{m}4$) high. Jabal Midra Shemali, the north-western summit of the range, is conical and rises to an elevation of 416 feet ($126^{m}8$) about 3 miles north-westward of Jabal Umm er Rūs.

Charts 3790, 3789, plan of approaches to Al Khobar.

About 5 miles southward of Ras Kuwakib is Al Khobar, close southward of which is a pier with a mast on its head and a pipe-line about 2 cables southward of it. The pier and the coast southward of it is fronted by a rocky shoal, with depths of less than 6 feet ($1^{m}8$), but there is a narrow channel, with depths of from 5 to 19 feet ($1^{m}5$ to $5^{m}8$), between the shoal and the coast.

Charts 2837, 2858, 748b.

Charts 3790, 3789, plan of approabhes to Al Khobar.

At Al Aziziyah, about 6 miles southward of Al Khobar, there is a wharf.

Tall i Zabānat is one of a group of four sand hills near the coast about 10 miles southward of Ras Kuwakib ; an isolated sand hill rises to an elevation of 50 feet ($15^{m}2$) about 2 miles farther southward ; both Tall i Zabānat and the isolated sand hill are good marks.

Chart 3790.

Dōha 'Ain as Saih, about 13 miles southward of Ras Kuwakib, is a shallow bay, in the entrance to which there is a depth of about 6 feet ($1^{m}8$). About 1¼ miles outside the entrance, and lying parallel with the coast is a long narrow sand bank, with a depth of 4 feet ($1^{m}2$).

Dōhat adh Dhulūm is an extensive shallow bay, entered westward of Kureya, a low sandy point about 7 miles southward of the entrance to Dōha 'Ain as Saih. The shores are uninhabited. Numerous sand hills extend inland for some distance from the northern and western shores of this bay ; but only the 50-foot ($15^{m}2$) hill mentioned above is at all prominent.

Hamadiya, a hill (*Lat. 25° 59′ N., Long. 50° 05′ E.*) on the southern side of Dōhat adh Dhulūm, is 120 feet ($36^{m}6$) high and extends eastward and westward for about one mile ; North hill, 2½ miles west-north-westward of Hamadiya, is small, round, and about 100 feet ($30^{m}5$) high ; both hills are good marks.

Channels westward of Jazīrat Bahrein.—Tidal streams.— Between the north-western extremity of Jazīrat Bahrein and the mainland westward the passage is much obstructed by reefs intersected by narrow and shallow channels of which the easternmost is considered the best and is the only one that has been examined.

In 1903, H.M.S. *Lapwing*, proceeding from Bahrein harbour to Al 'Oqair (page 212), passed between Khōr Fasht and Marwadi at mid-day about one hour after high water, when the reefs were not seen and no tidal stream was experienced.

Jabal Umm er Rūs, Jabal ad Dukhkhān, the higher peak on Umm Na'sān, Jazīrat Jidi, the Portuguese fort, and the northern extremity of the trees on Jazīrat Muharraq are good marks by which to fix the position of the vessel when passing through the narrows westward of Jazīrat Umm Na'sān ; but great difficulty is occasionally caused by refraction and mirage. The sandy islets on the western side of the passage are prominent. It is not desirable to proceed through the passage with a favourable tidal stream.

In the channel westward of Jazīrat Umm Na'sān, the tidal streams set southward and northward, attaining, at springs, a rate of from 2 to 3 knots.

Chart 2847.

Dōhat as Salwa.—This inlet is entered between Ras as Sauwād (page 198) and Ras Saiya, the extremity of a low sandy peninsula, about 28 miles westward. The eastern side of the inlet is bordered mostly by a sandy shore rising to sand hills, which, in the northern half, are close to the coast, and in the southern half farther inland. The western side is indented by a succession of bays separated by headlands consisting of sand dunes. Nowhere in the inlet have any great depths been found.

Al 'Oqair is situated on the western side of an inlet entered between the southern extremity of Ras Saiya, and Ras as Sufaira, about one

Charts 2837, 2858, 748b.

Chart 2847.

mile southward ; there are depths of from 4 to 6 fathoms ($7^{m}3$ to $11^{m}0$) as far in as the jetty. Al ʻOqair consists of a few buildings, a Custom house and an old fort, the latter being a low structure with four towers, about 60 feet ($18^{m}3$) high, near it. The jetty, at the head of which there is a depth of 3 feet ($0^{m}9$), is situated near the fort. A shoal, with depths of from 4 to 6 feet ($1^{m}2$ to $1^{m}8$), lies off the entrance to the inlet.

If intending to anchor off the eastern side of the peninsula, caution is necessary when approaching it, as the depths decrease very suddenly.

Jazīrat Zakhnūnīya, the northern end of which is situated about 3 miles south-eastward of Ras as Sufaira, is a bare sandy mound on which are a village and a fort. Ras Umm al Awa, a sand hill, terminates in a rocky point, between which and the coast of Jazīrat Zakhnūnīya, eastward, there is a narrow, shallow channel. Between the southern extremity of the island, abreast which the coast of Nejd ends and that of Trucial ʻOmān begins, and the north-western extremity of a large promontory southward of it, is a still narrower channel in which there is a depth of 4½ feet ($1^{m}4$).

Anchorage may be obtained, in a depth of 20 feet ($6^{m}1$), about a quarter of a mile offshore, southward of Ras Uuwaiqīl (Huwaiqīl), situated about 27 miles south-south-eastward of Ras Umm al Awa ; landing abreast the anchorage is good, the beach being steep-to.

Dōhat al Husain is entered about 16 miles south-south-eastward of Ras Uuwaiqīl (*Lat. 25° 09′ N., Long. 50° 34′ E.*) ; a few miles westward of this bay is Hashm Husaini, a sandstone range, which rises in a bluff about 300 feet ($91^{m}4$) high, which is a good mark. Southward of Dōhat al Husain there are depths of about 4 feet ($1^{m}2$) within half a mile of the coast. A plain extends 2 or 3 miles inland to hills about 300 feet ($91^{m}4$) high. Salwa village is situated at the head of Dōhat as Salwa, and in its vicinity are some ruins and three groups of palm trees.

For tidal streams in Dōhat as Salwa, *see* page 221.

Chart 3790.

BAHREIN HARBOUR TO AL QATIF.—Dangers.—Beacon.—Westward of Fasht al Jārim (page 200) there is an area much encumbered by reefs and shoals, through which Khōr al Bāb leads from Bahrein harbour to Al Qatif (page 216). In the vicinity of Ras as Sala, about 1¾ miles westward of Kalaiʻa (page 200), the reef is steep-to, but elsewhere on the eastern side of the channel the depths decrease gradually towards the reef. This channel should not be used by vessels with a draught of more than 15 feet ($4^{m}6$), and all vessels should employ a pilot from Manāma.

Chart 3792.

The southern entrance to Khōr al Bāb lies northward of West spit, whence it trends north-westward between Khōr Fasht and Fasht al Jārim. The channel is about a mile wide over its greater part and has several patches with depths of 18 feet ($5^{m}5$) in the fairway ; an extensive shoal, with depths of from 13 to 18 feet ($4^{m}0$ to $5^{m}5$), lies in the fairway about 4 miles northward of Khōr Fasht.

Chart 3790.

Jisjus, 4 feet ($1^{m}2$), high, is situated on a reef that dries and lies about 6 miles north-westward of Khōr Fasht ; it is one of several

Charts 2837, 2858, 748b.

Chart 3790.

sand banks on the outer part of the reef which extends about 8 miles north-eastward from Ras Kuwakib (*see* page 211). These sand banks undergo considerable alteration due to the strong winds and tidal streams ; they are usually visible from south-eastward when the tide is below mean sea level. Shoals, with depths of from 4 to 18 feet ($1^{m}2$ to $5^{m}5$), lie within 4½ miles east-south-eastward and 3½ miles north-eastward, of Jisjus and form the western side of Khōr al Bāb.

Hair as Sarah, on the eastern side of Khōr al Bāb, is a pearl bank, with a depth of 13 feet ($4^{m}0$) over it ; it extends about 6½ miles north-westward from Fasht al Jārim and over its rocky parts the sea is much discoloured. The bank, deepening eastward to 24 feet ($7^{m}3$), joins Hair al Adhalah (page 200). Detached patches, with depths of from 15 to 18 feet ($4^{m}6$ to $5^{m}5$), lie within 7 miles north-eastward of Hair as Sarah.

Najwa, a low sandy islet over half a mile in length north-eastward and south-westward, lies about 8½ miles northward of Jisjus ; a beacon stands on the north-western part of the islet. The islet is practically surrounded by reef which extends about one mile north-eastward and about 1½ miles southward from it. Najwa lies on a bank, with depths of less than 18 feet ($5^{m}5$), which extends about 2 miles south-south-eastward from the southern extremity and the same distance north-north-eastward from the northern extremity of the reef.

Between Hair as Sarah and Najwa (*Lat. 26° 33′ N., Long. 50° 15′ E.*) there is a channel, with depths of from 30 to 48 feet ($9^{m}1$ to $14^{m}6$) in the fairway, and between Najwa and Ras Khali (page 214), about 4½ miles south-westward, there is a channel with a least width of 1½ miles, with depths of from 18 to 42 feet. ($5^{m}5$ to $12^{m}8$).

Directions.—Vessels entering Khōr al Bāb from Bahrein harbour must guard against the west-going tidal stream which, at times, is very strong along the southern lines of Khōr Fasht and Marwadi. When northward of Khōr Fasht, after losing sight of the radio mast at Manāma and Jabal ad Dukhkhān, the only marks are Kalai'a, a rock on Fasht al Jārim, Jabal Umm er Rūs, Jabal Midra Shemali, and when near them, Jisjus and Najwa. A vessel should steer to pass through the fairway between Najwa, and Hair as Sarah. After rounding the northern end of Najwa, in a depth of not less than 5 fathoms ($9^{m}1$), the vessel may steer for Ras at Tannūra (page 216).

Chart 3789, plan of Approaches to Dammām port, 3790.

COAST OF NEJD.—Dangers.—About 8 miles north-westward of Ras Kuwakib (page 211) is Dammām, the principal fort of which has a conspicuous tower, about 70 feet ($21^{m}3$) high, situated on an islet on the coastal reef and nearly joined to the mainland ; there is a smaller fort on the mainland. The houses and forts are in ruins. The channels through the reefs, by which the native vessels approach the town, are shallow and are probably only practicable at high water.

South-westward of Dammām are some rocky hillocks, about 50 feet ($15^{m}2$) high, which, on account of their resemblance to the hulls of bāgalas, are called by the Arabs Marakibat Sadūn.

Ras Khali, which dries, lies about 5 miles east-north-eastward of the fort at Dammām. About 4½ miles north-westward of the fort at Dammām is As Saihāt, a town, in which there is a large fort ; westward of the town there is a sand hill, probably about 100 feet ($30^{m}5$)

Charts 3788, 2847, 2858, 748b.

Chart 3789, plan of approaches to Dammān port, 3790.

high. Thick date groves extend northward from the town, past Al Qatif for a distance of about 8 miles. On the coast, midway between As Saihāt and Al Qatif, is Hisār ʻAnik.

Chart 3789, plan of approaches to Dammām port.

Port of Dammām and approaches.—Lights.—Buoyage.—About 5 miles north-westward of Ras Kuwakib, a railway causeway about 4 miles in length, from which a steel trestle pier extension is built for nearly another 2 miles, projects north-north-eastward from the coast across Ras Khali. A coastguard station is situated about a quarter of a mile south-eastward of the root of the causeway.

The pier is approached from northward by a deep-water channel between Najwa (page 214) and Ras at Tannūra (*see* below).

The approach channel is marked by black three-pile light-beacons, each surmounted by a platform carrying the light-structure. The light-beacons are numbered from seaward, Nos. 2, 6, 8 and 10 beacons marking the western side of the approach and Nos. 7, 9 and 11 beacons marking the eastern side. No. 2 light-beacon is situated about 6 miles northward, No. 6 about about 3 miles north-north-westward, No. 8, about 7 cables west-north-westward, and No. 10 about 5 cables south-westward of the head of the pier. No. 7 light-beacon is situated about 2½ miles north-north-westward, No. 9 about 5½ cables eastward, and No. 11 about 7 cables south-eastward of the head of the pier. Nos. 2, 6 and 7 are each equipped with a black board showing the identification number in white.

A spar buoy is moored about 1¾ miles south-westward, and a mooring buoy is situated about 7 cables westward of No. 6 light-beacon (*Lat. 26° 34′ N., Long. 50° 11′ E.*).

A radio tower, 350 feet (106^{m}7) in height, from which *red* obstruction lights are exhibited, is situated about 1¼ miles south-south-eastward of the fort at Dammām.

Pilotage.—A vessel bound for Dammām, of which the estimated time of arrival has been received, will be boarded off No. 6 light-beacon by the Saudi Arabian Government Railway Dammām Port Authority Pilot, who will pilot to an anchorage or a berth alongside the pier. Pratique is granted at Dammām or Ras at Tannūra (*see* below). A vessel awaiting a pilot should anchor southward of No. 6 light-beacon.

Wharf and pier.—Mooring buoys.—A wharf, 844 feet (226^{m}8) in length and 86 feet (26^{m}2) wide, is situated at the head of the trestle pier. There are berths at the wharf for two large ocean-going vessels, one on each side, with a depth of 36 feet (11^{m}0) alongside. A tide-gauge is situated at the wharf head.

A large building is situated on the wharf.

On the eastern side of the railway causeway, near its junction with the trestle pier, there is a pier, 342 feet (104^{m}2) in length, which extends eastward into the bay. This pier is for the use of lighters, dhows, etc.; between it and the main wharf there are five mooring buoys.

Port facilities.—Dammām port is operated by Saudi Government Railroad officials. A 15-ton travelling crane is available either on the main pier or the small craft pier ; a fixed 5-ton crane is available on the western side of the main pier. For heavy lifts the use of a floating crane of 100 tons capacity can be arranged, but 72 hours notice is required.

Charts 3790, 3788, 2847, 2858, 748b.

Chart 3789, plan of approaches to Dammām port.

The small craft pier is equipped with cranes for handling cargo from lighters and dhows.

Both the main wharf and the small craft pier are equipped with rail facilities.

No coal or fuel oil for bunkers are available. Undistilled water can be obtained at the main wharf.

There are no repair facilities, and only emergency stores, provisions, and medical services, are available.

Anchorage.—Caution.—There are anchorage berths off the main wharf for several vessels ; four of these berths are situated on the eastern side of the pier approach, on a line between No. 7 beacon and No. 9 light-beacon, the remaining three berths are situated on the western side of the approach, on a line between Nos. 6 and 8 light-beacons.

Due to the irregular nature of the holding ground, which is mud interspersed with coral, dragging is possible and vessels should exercise caution. Tidal streams and currents of variable velocity and direction may be experienced, both these being affected by local winds.

Charts 3790, 3788.

Coast.—Al Qatif is an important town about 4½ miles north-northwestward of As Saihāt. It is situated in an oasis of the same name which extends about 9 miles northward and southward of the town and lies about 3 miles inland ; this oasis is bounded northward and westward by desert. In the town there is a fort, in the southern part of which there is a minaret, from 80 to 100 feet ($24^{m}4$ to $30^{m}5$) high, and in the north-western corner is the citadel. About 5 miles westward of the town is Miliolite, a hill 68 feet ($20^{m}5$) high. The climate of the oasis is damp and unhealthy ; malaria is prevalent.

Jazīrat Tārūt lies on the coastal reef which extends about 7 miles offshore ; on its eastern part are thick groves of high date palms. (*See* view facing page 230). Dārīn (*Lat. 26° 33′ N., Long. 50° 05′ E.*), on the southern extremity of Jazīrat Tārūt, is a town in which there is a square fort with a prominent tower.

Anchorage may be obtained, in a depth of 3 fathoms ($5^{m}5$), with the fort at Dārīn bearing 270°, distant about 4½ miles.

Al Qatif town can be reached by boats with a draught of 7 feet ($2^{m}1$) ; larger boats can enter by Khōr as Saihāt, a branch of the bight westward of Ras Khali which passes close eastward of the town of As Saihāt. Another branch of the bight trends southward and leads to Dammām. About 3 miles eastward of Dārīn is the entrance to a small channel, also available to large boats, which, trending westward, leads close past Dārīn and joins Khōr as Saihāt near Burj Abul Līf, a small fort on the reef about 1¾ miles westward of Dārīn. The main channel passes about 2½ cables eastward of Burj Abul Līf, above which the larger boats cannot go, though there is a small branch which admits such boats close up to the walls of the fort. Another channel, navigable at high water, leads round the northern end of Jazīrat Tārūt and joins the channel from Burj Abul Līf off Al Qatif.

A local pilot is necessary to take a boat with a draught of 2½ feet ($0^{m}8$), or more, up to Al Qatif.

Charts 3789, plan of approaches to Dammām Port, 3788.

Ras at Tannūra. — Beacons. — Lights. — Buoyage. — Ras at Tannūra is situated about 5 miles north-eastward of Jazīrat Tārūt ;

Charts 3789, plan of approaches to Dammām Port, 3788

it is the south-eastern extremity of a low-lying sand strip, less than a quarter of a cable wide in places, which, with a few sand hills on it, extends about 4 miles north-westward, where it joins the mainland. The highest of these sand hills, which appear white when the sun shines on them, is Adaime Hamer bin Yaber, 31 feet ($9^{m}4$) high, situated nearly 2 miles north-westward of Ras at Tannūra.

The extremity of Ras at Tannūra is level sand over coral, and is about 3 feet ($0^{m}9$) high. A beacon, consisting of the mast of a dhow, 52 feet ($15^{m}8$) high, stands near the extremity of the point.

A beacon stands in shoal water about 6½ cables south-westward of Ras at Tannūra ; another beacon, nearly 6 cables farther south-westward, stands on the north-eastern edge of the large reef which extends about 4 miles north-eastward of Jazīrat Tārūt ; a beacon stands in shoal water about 2 miles south-westward of Ras at Tannūra.

Dammām light-beacon No. 2, situated nearly 3 miles east-south-eastward of Ras at Tannūra, is the outermost light-beacon of those marking the approach to Dammām wharf, the details of which are referred to above.

A light is exhibited, at an elevation of 50 feet ($15^{m}2$), from a black, iron, framework tower, with a broad white horizontal band, 50 feet ($15^{m}2$) in height, situated on Ras at Tannūra.

A light is exhibited, at an elevation of 50 feet ($15^{m}2$), from a red, iron, framework tower with a broad black horizontal band, situated about 1¾ miles north-north-westward of Ras at Tannūra (*Lat. 26° 37′ N. Long. 50° 10′ E.*).

The reefs westward of Ras at Tannūra, and the large reef north-eastward of Jazīrat Tārūt, show up well.

Depths of less than 12 feet ($3^{m}7$) are to be found within 1½ cables southward and south-eastward of Ras at Tannūra, and a bank with depths of less than 18 feet ($5^{m}5$) over it, about 1½ miles in extent, lies within 1¼ miles south-eastward of the point. A can light-buoy, painted black and exhibiting a *white flashing* light *every five seconds*, is moored off the northern edge of this bank about 6 cables eastward of the light-beacon on Ras at Tannūra.

Within 1¼ miles northward of Ras at Tannūra, on the eastern side of the sand strip, there are wharves and mooring installations ; depths of less than 5 fathoms ($9^{m}1$) extend for as much as half a mile offshore in places in this vicinity.

On the western side of the sand strip, and extending for more than 2 miles north-westward from Ras at Tannūra, there is a stretch of water with a general width of about 2 cables, between the 3-fathom ($5^{m}5$) lines bounding it. The entrance to this stretch, in which there is a depth of 10 feet ($3^{m}0$), is, however, narrow and tortuous and its south-eastern side is bounded by shoals, some of which dry or nearly dry.

A radio tower, 144 feet ($43^{m}9$) in height, from which *red* obstruction lights are exhibited, is situated about 6½ miles north-westward of Ras Tannūra light structure.

The Custom house, off which there is a small pier, which dries, is situated on the western side of the sand strip, about 3½ cables north-westward of Ras at Tannūra beacon. West Oil Loading pier, which is L-shaped, lies 1¾ cables north-westward of West Cargo and Fish pier; it has a depth of 12 feet ($3^{m}7$) alongside its head and is used for the discharge of lighters.

Charts 3790, 2847, 748b.

Charts 3789, plan of approaches to Dammām Port, 3788.

Three mooring buoys lie off the West Oil Loading pier and two pillar buoys are moored 3½ cables westward and 2¾ cables north-westward, respectively, of the pier head.

Wharves.—Lights.—Beacons.—On the eastern side of the sand strip, about 6 cables northward of Ras at Tannūra, a causeway about 2½ cables in length projects eastward from the shore. At the head of this causeway there is a wharf, known as South pier, about 1½ cables in length, which forms a **T**-head to the causeway. There are four berths at the wharf, two on the outer side and two on the inner side, with a depth of 34 feet (10^m4) alongside, in 1949 ; a fixed sheer-leg crane, painted aluminium colour and 120 feet (36^m6) in height, stands on the wharf near its centre. Depths of 32 and 34 feet (9^m7 and 10^m4) lie, respectively, about one mile east-north-eastward and 1½ miles eastward of the crane.

Lights are exhibited from the southern and northern heads of South pier.

Another causeway extends from the coast about three-quarters of a mile north-westward of South pier. This causeway, which has an **L**-shaped head, is known as North pier, and is about 7 cables in length. Lights are exhibited from the northern and southern corners of the head of this causeway (*Lat. 26° 39′ N., Long. 50° 10′ E.*).

Between these causeways, submarine pipe-lines extend seaward for nearly half a mile to an oil berth.

A pair of leading marks, for the southern approach to the oil berth, which in line bear about 260°, exists about 3½ cables north-north-westward of the root of the southern causeway ; the front mark of this alignment consists of a diamond-shaped beacon, situated on the beach ; the rear mark consists of an aluminium-coloured oil tank, on the lower part of which is painted a green circle.

A pair of leading marks, for the northern approach to the oil berth, which in line bear about 245°, exists about one cable north-westward of the leading marks referred to above; the front mark of this alignment consists of a triangular-shaped beacon on the beach; the rear mark is an aluminium-coloured oil tank, on the lower part of which is painted a black circle within which is a black stripe.

Anchorages.—Tidal streams.—Caution.—The harbour is exposed and difficult for boat and lighter work. Anchorage may be obtained north-eastward of South pier in depths of about 8 fathoms (14^m6), mud and sand. The tidal streams at this anchorage set northward and southward at rates of from 3 to 5 knots.

Restricted anchorage may also be obtained off the western side of the sand strip, south-westward of West Cargo and Fish pier, in depths of about 4 fathoms (7^m3). This anchorage is not recommended as the tidal streams, even at neaps, are very strong ; the area due westward of West Cargo and Fish pier is filled by piles for the use of lighters mooring there. The anchorage is, however, well sheltered from the shamāl but, the bottom being hard, a good scope of cable should be veered ; the kaus sends in a heavy sea, in which case better shelter will be found north-westward of Najwa (page 214).

In the vicinity of Ras at Tannūra, tidal streams of from 4 to 5 knots are experienced. A vessel rounding the point should have good way on her, on account of eddies and tide-rips.

Charts 3790, 2847, 2858, 748b.

Charts 3789, plan of approaches to Dammām Port, 3788.

The reefs southward of the entrance to the inner anchorage are usually visible.

Berthing.—Port facilities.—All vessels should report their estimated time of arrival by radio ; a berthing master is available for berthing vessels at South pier.

Should a vessel require a pilot, ample notice must be given of her estimated time of arrival at Sitra anchorage (page 210), where a pilot, if available, will board.

Four tugs and about 14 lighters of about 100 tons capacity are stationed in the harbour.

There are 120-ton sheer-legs on the head of South pier, but it has been reported that their lift is limited to 75 tons by the foundations. A 20-ton travelling crane is available on North pier.

Floating cranes of 100 and 200 tons capacity are available.

Small ship repairs can be effected, and an electric welding plant is available.

Fuel and diesel oil are obtainable by pipe-line at East jetty.

There is no boiler water available, but drinking water of poor quality is piped to the wharves and distilled water to the western pier.

There is a Port medical officer at Ras at Tannūra.

In 1949, the population in the area was estimated to number about 2,000 Europeans and from 4,000 to 10,000 natives.

Charts 3788, 3790.

Off-lying dangers.—Tower.—Lights.—Buoyage.—Caution.—Hair Khorah (*Lat. 26° 41′ N., Long. 50° 18′ E.*) with general depths of less than 6 fathoms ($11^{m}0$), in the middle of which there is a 13-foot ($4^{m}0$) coral patch, lies with its centre about 8 miles north-eastward of Ras at Tannūra. A steel framework tower, 50 feet ($15^{m}2$) high and surmounted by a rectangular daymark, stands about 8 cables east-south-eastward of the 13-foot ($4^{m}0$) patch ; a 12-foot ($3^{m}7$) shoal lies on the southern part of Hair Khorah about 2¼ miles southward of the 13-foot ($4^{m}0$) patch.

A light is exhibited from No. 34 three-pile beacon about 4 miles south-south-westward of the framework tower on Hair Khorah. Depths of 17 and 27 feet ($5^{m}2$ and $8^{m}2$) lie, respectively, 2 cables and 7 cables westward of this light-beacon.

Hair Shiggitah, a bank with a depth of 24 feet ($7^{m}3$), lies eastward of Hair Khorah and is separated from it by a channel about 2¼ miles wide in which there are depths of from 6 to 12 fathoms ($11^{m}0$ to $21^{m}9$).

No. 55 beacon is situated off the north-eastern side of Hair Shiggitah about 6¼ miles north-eastward of the shoalest part of that bank.

A light is exhibited from No. 33 three-pile beacon on the southern side of the channel between Hair Shiggitah, and Hair al Adhallah (page 200), about 11¾ miles eastward of No. 34 light-beacon.

A light is exhibited from No. 32 three-pile beacon, situated on the south-eastern end of Hair Shiggitah about 5 miles eastward of No. 33 light-beacon.

A light is exhibited from No. 31 three-pile beacon, situated off the northern edge of Hair Sh'Taya (*see* page 199).

Chart 3788.

A light-and-whistle buoy, exhibiting a *white flashing* light *every eight seconds*, is moored about 6 miles north-eastward of No. 31 light-beacon.

Charts 2487, 2858, 748b.

Chart 3788.

A light is exhibited, at an elevation of 30 feet ($9^{m}1$), from No. 7 black steel pile beacon, situated about 4½ miles northward of Ras at Tannūra on the edge of the 6-fathom ($11^{m}0$) line which borders the coastal bank northward of the point.

Hair al Was'ah, a sandy shoal with a depth of 28 feet ($8^{m}5$), and a 33-foot ($10^{m}1$) patch, sand and coral, lie, respectively, about 6 miles north-north-eastward and 3¼ miles east-north-eastward of No. 7 light-beacon.

A light is exhibited from a pile beacon situated on Hair al Was'ah (*Lat. 26° 48′ N., Long. 50° 12′ E.*).

Hair as Sufrah, with a depth of 9 feet ($2^{m}7$), lies about 11 miles northward of No. 7 light-beacon.

A light is exhibited at an elevation of 30 feet ($9^{m}1$), from No. 5 black, steel, pile beacon, situated on Hair al Bihaim, the south-eastern part of Hair as Sufrah.

Vessels of deep draughts are advised to keep No. 5 light-beacon on Hair al Bihaim bearing not more than 226° when at a distance of between 4 to 10 miles from it.

Hair Abu Subayti, a detached shoal, with a depth of 16 feet ($4^{m}9$) over it, lies about 4 miles east-north-eastward of No. 5 light-beacon.

Hair Abu Dagal, a large detached shoal with depths of less than 10 fathoms ($18^{m}3$), and a least depth of 35 feet ($10^{m}7$) over it, lies with its shoalest part, about 5 miles eastward of Hair Abu Subayti.

Fasht Abu Sa'afah, about 13 miles north-eastward of Hair As Sufrah, is a rocky patch marked by iron piles. The sea breaks heavily over this patch at times, there being depths of only 3 feet ($0^{m}9$) over its shoalest part ; at high water, with a calm sea, the shoal cannot always be distinguished ; the bottom around it is sand, and the shoal is steep-to.

A light is exhibited, at an elevation of 30 feet ($9^{m}1$), from a black steel structure on piles, with " 2 " painted on the sides, and fitted with a radar reflector, situated about one mile northward of the shoalest part of Fasht Abu Sa'afah.

Hair al Khshainah, with a depth of 28 feet ($8^{m}5$) over it, lies on the south-western extension of Fasht Abu Sa'afah, about 5 miles west-south-westward of No. 2 light-beacon. A shoal, with a depth of 30 feet ($9^{m}1$), lies about 4 miles south-eastward of No. 2 light-beacon.

Fasht ar Jayjeh, with a depth of 19 feet ($5^{m}8$) over it, lies on the south-eastern extension of Fasht Abu Sa'afah, about 6 miles south-eastward of No. 2 light-beacon ; a drilling pier, consisting of a red cylindrical steel structure on a platform, from which a light is exhibited at an elevation of 16 feet ($4^{m}9$), stands on this shoal. These shoals are frequented by fishermen.

Hair Naiwat al Washeer, with a depth of 39 feet ($11^{m}9$), over it, lies about 3¾ miles south-eastward of the drilling pier light-structure on Fasht ar Jayjeh.

For shoals farther eastward, *see* page 199.

Fasht Gharibah, with a depth of 19 feet ($5^{m}8$) over it, lies about 10 miles west-north-westward of Fasht Abu Sa'afah.

A light is exhibited, at an elevation of 30 feet ($9^{m}1$), from a black, steel pile beacon with " 3 " painted on its side, situated on the south-western part of Fasht Gharibah ; the beacon is equipped with a radar reflector.

Charts 2847, 2837, 2858, 748b.

Chart 3788.

Fasht Um al Jamal, a rocky shoal, with a depth of 6 feet ($1^{m}8$) over it, and marked near its southern end by a beacon, lies about 13 miles north-westward of No. 3 light-beacon (*Lat. 26° 59′ N., Long. 50° 13′ E.*). Between them are several detached shoals, with depths of from 9 to 36 feet ($2^{m}7$ to $11^{m}0$). A shoal with a depth of 13 feet ($4^{m}0$), lies about 5 miles east-north-eastward ; and two shoals, with depths of 21 and 22 feet ($6^{m}4$ and $6^{m}7$), respectively, lie about 7 miles south-south-eastward of Um al Fasht Jamal.

A shoal with a depth of 9 feet ($2^{m}7$), lies about 3¾ miles south-south-westward ; two shoals, with depths of 9 and 20 feet ($2^{m}7$ and $6^{m}1$), lie, respectively, 5½ and 7 miles south-westward ; and a shoal, with a depth of 16 feet ($4^{m}9$), lies about 2½ miles westward of Fasht Um al Jamal.

Charts 3788, 3790.

Directions.—A vessel approaching Ras at Tannūra, from eastward, if of deep draught, should use the "Fifty-foot" channel, following the track indicated on chart 3788 by a pecked line. From a position about 8 cables 012° from the light-and-whistle buoy, situated about 10 miles north-north-westward of Bahrein light-vessel, she should steer to pass through positions 2·6 miles 097°, and 1·9 miles 141°, respectively, from No. 5 light-beacon, and thence to a position about 3·8 miles 169° from No. 7 light-beacon.

A vessel approaching by the "Thirty-foot" channel, which is normally used by vessels of light draught, should follow the track indicated by a pecked line on chart 3790, passing northward of Nos. 31 and 33 light-beacons, and southward of Nos. 32 and 34 light-beacons.

A north and south channel, which is indicated by a pecked line on the charts, runs from a position 3·8 miles 308° from No. 55 light-beacon, to a position 1·7 miles 105° from No. 32 light-beacon, connecting the "Thirty-foot" and "Fifty-foot" channels. There is a least depth of 33 feet ($10^{m}1$) on this track.

Charts 3790, 2847.

TIDAL STREAMS.—The tidal streams are felt everywhere on the Great Pearl bank, especially near the reefs and islands. From Ras Rākān (*Lat. 26° 11′ N., Long. 51° 14′ E.*), the west-going tidal stream sets along the coast, southward into Dōhat as Salwa, between Ras Rākān and Jazīrat Bahrein. Off Jazīrat Bahrein and amongst the outlying reefs, the tidal streams are much affected by the wind, but, to a certain extent, they follow the general trend of the reefs, attaining at springs a rate of from one to 2 knots, and even 3 knots at times, but this is very exceptional.

Between Jazīrat Bahrein and Al Qatar, the tidal streams are, for the most part, weak and the rise and fall is slight. There are, however, heavy tide-rips in Dōhat as Salwa, southward of Jazīrat Bahrein, caused by the sudden alterations in depth. The configuration of the land would point to a greater rise and fall in the latter locality than immediately northward, but no observations have been made.

Careful observations made, in 1901 and 1902, by R.I.M.S. *Investigator*, whilst at anchor between Jazīrat Bahrein and Jazīrat Hawār, show that the spring rise never exceeds 3 or 4 feet ($0^{m}9$ or $1^{m}2$) in that locality.

Charts 2837, 2858, 748b.

Charts 3790, 2847.

The tidal stream, from north-eastward, sets southward along the eastern side of Fasht al Jārim, until abreast Ras al Ain, where, joining the stream flowing westward along the northern edge of Jazīrat Kasaifa, it turns south-westward into Bahrein harbour.

Northward of Fasht al Jārim and across the eastern part of Hair Shiggitah, the tidal streams set south-westward and north-eastward, turning southward and northward, respectively, along the western side of Fasht al Jārim and south-eastward and north-westward between Fasht al Jārim and Khōr Fasht in Khōr al Bāb, but eastward of and over Khōr Fasht they set southward and northward.

The tidal streams set southward and northward over Hair Khorah and south-westward and north-eastward between Jisjus and Najwa.

The southern edges of Hair Khorah and Hair Shiggitah are marked by overfalls.

The streams set south-eastward and north-westward between Jazīrat Muharraq and Jazīrat Bahrein, and eastward of Jazīrat Muharraq they set southward and northward. In the entrance to Bahrein harbour, northward of Jazīrat Muharraq, they set west-south-westward and east-north-eastward attaining rates of from one to 2 knots.

The tidal streams seem to divide and meet near Ras at Tannūra ; south-eastward of that point, the general west-going stream sets southward, and the east-going stream, northward ; northward of the point, the general west-going stream sets north-westward, and the east-going stream, southward ; the general east-going stream appears to set north-eastward from Ras at Tannūra, passing between Fasht Abu Sa'afah and Hair Abu Hagul ; but the streams are not strong enough to interfere with safe navigation.

Charts 3788, 2847.

COAST OF NEJD (*continued*).—**Dangers.—Light.—Towers.**—The coast of Nejd between Ras at Tannūra (*Lat. 26° 37′ N., Long. 50° 10′ E.*) and Ras al Misha'āb, about 125 miles north-westward, is a low sandy or stony desert with, at intervals, a few isolated hills ; it is fronted for nearly the whole distance by extensive reefs which, in places, have passages inside them, and there are several low off-lying islets. The water is not usually as clear as it is farther southward, for in places the bottom is of white clay and the shoals do not, in consequence, show up so well. Many patches of whitish muddy colour, apparently indicating shoals, are frequently seen where no change in depth exists, yet the warning of discoloured water must not be disregarded. With the exception of the settlement at Khuwair al Jabal, (page 223) and the villages on Jazīrat al Jinna, (page 224), and Jazīrat al Musallamīya (page 224), there are neither towns, villages, nor a fixed population on the coast, the only inhabitants being several tribes of Bedouin.

A flare was reported, in 1952, to be burning about 4¼ miles north-westward of West Oil loading pier at Ras Tannūra.

The Great Pearl bank decreases in width off this coast, and may be said to end in the vicinity of Jazīrat Abu 'Ali (page 223), although pearls are sought on a small scale on some of the banks northward of that island. This part of the Persian gulf has been very incompletely surveyed.

Charts 2837, 2858, 748b.

Charts 3789, plan of Dhalaifan anchorage, 3788.

Ras al Jailaiya (Qalīya), on which there is a high sand hill, lies about 18 miles north-westward of Ras at Tannūra ; foul ground extends nearly 1¼ miles from the point. About 3½ miles westward of Ras al Jailaiya is Ras al Ghār, a cliff, 33 feet ($10^{m}1$) high. Jabal Dhalaifain, about 1½ miles south-westward of Ras al Ghār, is a remarkable square black rocky hill, 79 feet ($24^{m}1$) high. Ras Basit Shira's lies about 4 miles north-westward of Ras al Ghār.

Chart 3789, plan of Dhalaifain anchorage.

Anchorage may be obtained, in a depth of about 7 fathoms ($12^{m}8$), sand and rock, with Ras al Ghār bearing 199°, distant 3 miles. This anchorage is open to winds from northward and north-westward, which here blow strongly at times during a shāmal. The tidal streams set parallel with the coast at a rate of from one to 2 knots.

Chart 3788.

A steel framework tower, surmounted by a diamond daymark, stands about 4¾ miles north-eastward of Ras al Jailaiya.

Jabal al Bahri, about 10½ miles north-westward of Ras Basit Shira'a, is a high sand hill lying close off a slightly projecting point, on which is the settlement of Jubail, with a water tower, about 1¾ miles westward of the point. Farther inland are some high sand hills and on the coast a few miles north-westward of Jubail is a stony hillock. Khuwair al Jabal is a small creek on the northern side of Jabal al Bahri; it has a good boat anchorage, protected from most winds except the nashi.

A steel framework tower, surmounted by a spherical daymark, stands about 7¼ miles east-south-eastward ; and a similar tower, with a rectangular topmark, stands about 5 miles north-north-eastward of Jabal al Bahri.

Charts 3788, 2847.

Jazīrat al Bātina, about 12½ miles north-westward of Jabal al Bahri, is an island forming the western shore of Dōhat Abu 'Ali, a shallow bay. Jazīrat Abu 'Ali lies close northward of Jazīrat al Bātina, and between them there is a shallow narrow passage. The ruins of a tomb stand on a small hill westward of the light-structure westward of Ras Abu 'Ali, the eastern extremity of Jazīrat Abu 'Ali (*Lat. 27° 18′ N., Long. 49° 43′ E.*). A sand spit, with depths of from 4 to 18 feet ($1^{m}2$ to $5^{m}5$) over it, extends about 2¼ miles eastward from Ras Abu 'Ali ; at low water numerous cormorants settle on the spit.

A light is exhibited, at an elevation of 30 feet ($9^{m}1$), from an iron, framework tower, surmounted by a rectangle with " M9 " painted on it, and 50 feet ($15^{m}2$) in height, situated about three-quarters of a mile westward of Ras Abu 'Ali. Two towers lie off Ras Abu 'Ali.

Anchorages.—Good anchorage during a shamāl may be obtained by vessels with local knowledge, in Dōhat Abu 'Ali southward of Ras Abu 'Ali, there being but little reef on the southern side of the point, though shoal water extends nearly 4½ miles offshore from the western side of the bay. In depths of less than 9 fathoms ($16^{m}5$), the bottom is hard sand, but in greater depths it is mud ; the soundings are fairly regular.

When rounding the spit extending from Ras Abu 'Ali, its eastern extremity should be given a wide berth, for the depths shoal very rapidly and a heavy sea breaks on its weather side.

Charts 2837, 2858, 748b.

Chart 2847.

Coast.—Dōhat ad Dafi is an extensive shallow inlet extending south-eastward on the western side of Jazīrat al Bātina, and terminating in a swamp. Between the north-western side of Jazīrat Abu ʻAli and Ras al Bidyaʻ, a low sandy point with tufts of grass on it, about 10 miles north-westward, there is an extensive but shallow bay, in the northern part of which is Dōhat Musallamīya.

Jazīrat al Jinna, about 2½ miles southward of Ras al Bidyaʻ and about 1½ miles off the western shore of the bay, is 180 feet ($54^{m}7$) high and of a light colour, its western part being low and its summit level, with a large fort and round tower on it. On the northern side of the island there is a village. Sand banks, which dry, extend about 2 miles northward and one mile eastward from the island. There is a small basin, with depths of 3 fathoms ($5^{m}5$), available for boats, close north-eastward of the island; the entrance, which is from eastward, dries.

Dōhat Musallamīya extends about 9½ miles westward from Ras al Bidyaʻ. The entrance is about 2 cables wide between the point and the reefs and sand banks extending northward from Jazīrat al Jinna, which latter are distinguishable even at high water; in places there are bars, with depths of about one fathom ($1^{m}8$), over them, but within them there is a deep, though somewhat tortuous channel, which leads nearly up to Jazīrat al Musallamīya (*see* below) and at high water boats are able to get to the village which stands amongst some trees on the eastern side of that island. The bay is encumbered with numerous sandbanks and reefs but, being usually visible, they are easily avoided. The mainland on the northern side of the bay is everywhere low; but just southward of Jazīrat al Musallamīya there is a remarkable cliffy bluff, the coast for some miles southward of which is from 50 to 80 feet ($15^{m}2$ to $24^{m}4$) high with a growth of shrubs.

Jazīrat al Musallamīya, which has some low sand hills on it, lies about 5 miles westward of Ras al Bidyaʻ (*Lat. 27° 25′ N., Long. 49° 19′ E.*).

A branch of Dōhat Musallamīya, in which there are depths of about 3 fathoms ($5^{m}5$), extends southward, between the western side of Jazīrat al Jinna and the mainland; a channel leads from this branch to the village on the island, giving access by boat to the latter at high water.

The best anchorage, when visiting either Jazīrat al Jinna or Musallamīya, is about 5 miles north-eastward of the fort on Jazīrat al Jinna, in depths of 4 or 5 fathoms ($7^{m}3$ or $9^{m}1$); the anchorage affords but little shelter from either the shamāl or the kaus, and inshore of it are extensive sand banks with numerous ridges and reefs running northward and southward. When anchoring in this locality allowance must be made for a difference in the level of the sea due to the action of the winds, as well as that due to the tides; in a position where a depth of 18 feet ($5^{m}5$) was obtained, after a strong kaus had blown for 12 hours, there was, on the following day, a depth of only 14 feet ($4^{m}3$), and that, when a strong shamāl had followed the kaus, and had been blowing for several hours.

Jazīrat al Jinna is approached through the main channel, steering west-south-westward from its entrance, until the village on that island bears 180°; thence the village may be steered for, keeping close to the sand banks on the eastern side of the channel.

Charts 2858, 748b.

Chart 2847.

The village of Musallamīya is approached through the main channel, steering towards the remarkable bluff on the mainland southward of it; when close to the mainland the channel turns towards the island.

About 7½ miles north-north-westward of Ras al Bidya‘ is Ras al Ghār, a low point, close within which are some brownish rocky hillocks overgrown with shrubs. Shoals with depths of 16 and 12 feet ($4^{m}9$ and $3^{m}7$) lie, respectively, 7 and 12¼ mile north-eastward; and two reefs with depths of less than 6 feet ($1^{m}8$), lie respectively, 6 and 8 miles north-westward of Ras al Ghār.

Charts 3788, 2847.

Inshore channel.—Dangers.—Towers.—From abreast Ras at Tannūra, a navigable channel, through which a depth of 30 feet ($9^{m}1$) could probably be carried in daylight, leads north-westward for about 70 miles, its north-western entrance lying between Ras al Ghār and Fasht al Kash (page 225).

Chart 3788.

A shoal, with a depth of 17 feet ($5^{m}2$), lies about 4¾ miles north-north-eastward of Ras al Jailaiya; a tower, *see* page 223, stands about half a mile south-eastward of this shoal. A shoal, with a depth of 28 feet ($8^{m}5$), lies about 6 miles north-north-eastward of Ras Basit Shira‘a.

Jazīrat Jaraid, about 14 miles north-eastward of Jabal al Bahri, is a sand islet about 12 feet ($3^{m}7$) high, and covered with thin scrub; it is fringed by a reef which extends about three-quarters of a mile from its northern side. The islet appears to be a breeding place for cormorants. A beacon-tower stands on Jazīrat Jaraid (*Lat. 27° 10′ N., Long. 49° 51′ E.*).

Two beacon towers east-south-eastward and north-north-eastward of Jabal al Bahri are described on page 223.

Jazīrat Jānāh lies about 10½ miles north-north-westward of Jazīrat Jaraid; it is a sand islet covered with thin scrub, and is about 10 feet ($3^{m}0$) high. A steep-to reef fringes the islet extending as much as one mile offshore. Shelter from either the shamāl or the kaus can be found under its lee. A steel, framework tower, 50 feet ($15^{m}2$) in height, surmounted by a rectangle with " M10 " on it, stands on the south-western end of the islet.

Chart 2847.

Fasht al Kash extends about 5 miles north-eastward from a position about 13 miles north-eastward of Ras al Bidya‘.

Directions.—A vessel approaching the inshore channel from northward should make Jazīrat al Harqūs (page 227) or Jazīrat al Qīran (page 226), and thence steer for a position on the mainland close south-eastward of Ras al Ghār, taking care to avoid the shoals situated north-eastward of that point.

Outlying islets and dangers.—Light-Beacons.—Tidal streams.—Caution.—Within 55 miles north-eastward of Ras al Ghār are five very low islets, which are steep-to. They are difficult to make out in the haze associated with a shamāl, especially in summer, and should never be approached at night. The tidal streams in the vicinity of this group of islets set westward and eastward; but the times of the turn of the streams are not known; between Jazīrat ‘Arabi and Jazīrat Fārsi they appear to attain a rate of about one knot. If anchoring off any of these islets, caution must be exercised

Charts 2858, 748b.

Chart 2847.

when approaching them, for the depths shoal rapidly and soundings give no warning.

Chart 3452, plan of Jezirat Farsi.

Jazīrat Fārsi, the outer islet of the group, lies about 55 miles north-eastward of Ras al Ghār ; it is about 10 feet ($3^{m}0$) high and is overgrown with coarse grass and brushwood ; the beach is of white sand and its fringing reef extends from 3 to 4 cables from its northern end, for a greater distance from its western side, and about one cable from its southern side; it shows up plainly. On the southern side of the islet, protected from the sea by a reef, is a small lagoon that can be entered by pulling boats on its southern side. In 1949, the boat passage and the western entrance to the lagoon had silted up, but landing can easily be effected on the beach on the western side of the islet. A pyramidal beacon, 12 feet ($3^{m}7$) high, composed of loose stones, stands on the northern end of the islet. In 1924, H.M.S. *Cyclamen* anchored south-westward of the islet ; and, in 1931, H.M.S. *Triad* anchored, in a depth of 27 fathoms ($49^{m}4$), with the pyramidal beacon bearing 338°, distant about half a mile. At certain seasons flocks of small birds settle on the islet and their cries can be heard on a calm night at a distance of about one mile, sometimes even before the islet is sighted ; turtle abound.

A light is exhibited, at an elevation of 90 feet ($27^{m}4$) from an iron, framework structure, painted black and white in horizontal bands and 75 feet ($22^{m}9$) in height, situated on Jazīrat Fārsi.

A shoal, with a depth of 13 feet ($4^{m}0$) over it, the position of which is approximate, was reported, in 1952, to lie about 4½ cables east-north-eastward of the light-structure.

Chart 3452, plan of Jezirat Arabi.

Jazīrat 'Arabi (*Lat. 27° 47′ N., Long. 50° 11′ E.*), about 13 miles southward of Jazīrat Fārsi, is about 10 feet ($3^{m}0$) high, and consists of sand on a rocky base. The islet is fringed by a reef, which extends as much as 2½ cables off shore from the southern side and 3½ cables from the ends of the islet. A cairn about 6 feet ($1^{m}8$) high, stands on the northern side of the islet. In 1924, H.M.S. *Cyclamen* anchored south-westward of the islet ; and, in 1931, H.M.S. *Triad* anchored, in a depth of about 25 fathoms ($45^{m}7$), with the cairn bearing 330°, distant about 3¾ cables. Landing can easily be effected on the beach on the northern side of the islet ; elsewhere, landing is bad, and at low water it is almost impossible to get a boat on shore on account of the large number of drying rocks. The islet swarms with birds, chiefly cormorants, and in the season it is covered with nests and young ones, so that it is scarcely possible to walk without treading on eggs. At one time it had on it a deposit of guano a few inches thick ; it is visited by fishermen for turtle.

Chart 2847.

Jazīrat al Qīran, about 19 miles west-south-westward of Jazīrat 'Arabi, is only a few feet high, quite level, and covered with brushwood. A fringing reef surrounds the islet, extending about one mile north-westward, and half a mile south-eastward. The islet is frequented by fishermen. Anchorage may be obtained on the south-eastern side of the islet. Vessels should not anchor in depths of less than 17 fathoms ($31^{m}1$), for the reef is very steep-to, a depth of 10 fathoms ($18^{m}3$) being found within a few yards of its edge.

Charts 2858, 748b.

Chart 2847.

A steep-to shoal, with a depth of 9 feet ($2^{m}7$) over it, lies about 7 miles north-eastward of Jazīrat al Qīran.

Jazīrat al Quraiyin, a sandy islet about 2 feet ($0^{m}6$) high, lies about 4 miles southward of Jazīrat al Qīran ; it is fringed by a reef which is usually covered with birds.

A bank, with a depth of 5 fathoms ($9^{m}1$) over it, is reported to lie about 8 miles eastward of Jazīrat al Quraiyin, but its position has not been determined and, in 1857, the Indian Government vessel *Euphrates* passed over its assigned position without finding it.

There is a channel with depths of from 7 to 14 fathoms ($12^{m}8$ to $25^{m}6$) in it, between Jazīrat al Quraiyin and Jazīrat al Qīran. The area southward and westward toward Jazīrat Jānāh and Fasht al Kash, respectively, appears to be clear but has only been partially examined and caution is therefore necessary.

Jazīrat al Harqūs, about 34 miles north-eastward of Ras al Ghār, is a sandy islet, about 3 feet ($0^{m}9$) high, with a narrow fringing reef. The islet does not appear to be frequented with birds. An iron beacon, 30 feet ($9^{m}1$) in height, surmounted by a triangle, stands on the middle of the islet. In 1951, this islet was reported to lie about 8 cables eastwards of its charted position.

A shoal, over which the depth is unknown, was reported, in 1949, to lie about 8 miles northward of Jazīrat al Harqūs, and a 4-fathom ($7^{m}3$) and a 5-fathom ($9^{m}1$) patch have been reported to lie about 15 and 22 miles north-north-westward, respectively, of the same islet. In the area northward of this islet, between Jazīrat Fārsi (page 226) and "No. 9" beacon (page 228), depths of 13 fathoms ($23^{m}8$) are reported, together with many unsurveyed shoals; vessels should pass through this area in daylight only, in conditions of high sun when shoals show up clearly.

Coast.—Dangers.—Between Ras al Ghār (page 225) and Ras at Tanājīb, about 25 miles west-north-westward, the coast is mostly low, with foul ground extending in places from 5 to 9 miles offshore, the bottom being chiefly white clay. Jabal al Manīfa, lying on the coast about 17 miles west-north-westward of Ras al Ghār, is a small hill ; about 2½ miles south-westward of Jabal al Manīfa is Dōhat Manīfa, close north-westward of which is Dōhat Balbūl, a small bay which affords anchorage to boats. Ras at Tanājīb rises steeply to a flat-topped light-coloured hill, from 70 to 100 feet ($21^{m}3$ to $30^{m}5$) high.

Dōhat al Kharais is an extensive bight entered between a point, situated about 11 miles northward of Ras at Tanājīb, and Ras as Saffānīya, about 5 miles north-north-westward ; little is known of this bight except that its shores are low, with a few hillocks. Ras as Saffānīya is low, and the coast continues so for the greater part to Ras al Misha'āb, about 15 miles north-north-westward. Jabal Thaluf, about 6½ miles westward of Ras as Saffānīya (*Lat. 28° 00′ N., Long. 48° 48′ E.*), has a bluff on its northern side, which rises in two steps to an elevation of about 40 feet ($12^{m}2$).

Charts 2847, 3960.

Off-lying dangers.—Lights.—Beacons.—Caution.—Fasht Bildāni extends about 20 miles offshore between Ras at Tanājīb and Ras al Misha'ab. Ras Bildāni, the south-eastern extremity of the reefs, lies about 22½ miles eastward of Ras as Saffānīya, and from it the edge of the reef, which appears to be continuous, extends about

24 miles north-westward, and thence about 7 miles south-westward to Kassār al Mitma, forming the south-eastern side of the approach to Bandar Misha'ab (*see* below). Parts of Fasht Bildāni are above water and parts dry ; there are depths of about 10 fathoms (18m3) half a mile outside the reefs. A channel leads along the coast inshore of Fasht Bildāni ; it has not been examined, but is reported by the Arabs to be navigable.

A number of oil-well platforms have been erected (1954) on the north-western part of Fasht Bildāni, northward of Ras as Saffānīya.

Two detached patches, with depths of 12 and 13 feet (3m7 and 4m0) over them, lie, respectively, about 11 miles north-north-westward and 10 miles northward of Ras Bildāni ; the water is slightly discoloured over these shoals.

A three-pile beacon, No. 9, 30 feet (9m1) high and surmounted by a yellow globe, stands on the 13-foot (4m0) patch just mentioned. For caution concerning the area between No. 9 beacon (*Lat. 28° 08′ N., Long. 49° 11′ E.*), and Jazīrat Fārsi *see* page 226.

Fasht Bildāni should not be approached at night into depths of less than 18 fathoms (32m9), nor by day, when in clear weather they can be seen at a distance of about 3 miles, into less than 15 fathoms (27m4) ; the land is not in sight from seaward of the reef. The 13-foot (4m0) patch, marked by No. 9 beacon, should be given a wide berth.

Anchorage, sheltered from the shamāl but open to the kaus, might be obtained under the lee of the reefs between Ras Bildāni and Ras at Tanājīb, with the hill on the latter bearing 260°, distant about 8 miles.

Chart 3960.

Bandar Misha'ab. — Dangers. — Lights. — Beacons. — Jabal 'Amādah about 2½ miles south-westward of Ras al Misha'ab, is dark volcanic-looking hill, 105 feet (32m0) high, which appears from north eastward as four hummocks. Ras al Misha'ab is low and sandy, but is faced, in places, with low cliffs.

Jazīrat al Maqta', close southward of Ras al Misha'ab, has cliffs from 20 to 30 feet (6m1 to 9m1) high on its eastern side, and is covered with grass and brushwood. There is no channel between the island and the mainland. A bank with depths of less than 18 feet (5m5) over it, on which lie numerous patches with depths of less than 6 feet (1m8), extends about 3 miles eastward and south-eastward of Jazīrat al Maqta' ; a sandy spit, that dries, extends about 2 miles eastward from the northern end of the island.

Kasr Umm as Sahāl, a patch that almost dries, lies near the edge of the coastal reef that extends about 4 miles north-north-eastward from Jazīrat al Maqta' and over which there are general depths of 12 feet (3m7). The position of this shoal is approximate.

A three-pile light-beacon, No. 8, about 15 feet (4m6) high and surmounted by a drum, marks a shoal situated about 17 miles east-north-eastward of Jazīrat al Maqta', and about 11½ miles west-north-westward of No. 9 beacon.

A three-pile light-beacon, No. 7, surmounted by a yellow ball, is situated on the northern side of a 12-foot (3m7) patch, about 5 miles westward of No. 8 light-beacon (*Lat. 28° 13′ N., Long. 48° 52′ E.*).

In 1948, a shoal on which a vessel drawing 24 feet (7m3) struck

Chart 3960.

believed at the time to be a reef or a coral head, was reported to exist in a position about 6¼ miles northward of No. 7 light-beacon ; steering due northward from this position, the vessel observed numerous uncharted reefs and breakers extending for about 3 miles on both sides of her course.

A 15-foot ($4^{m}6$) coral patch was reported, in 1952, about 6 miles north-westward of No. 7 light-beacon.

A three-pile light-beacon, No. 6, surmounted by a yellow cone, point up, 30 feet ($9^{m}1$) high, stands about 3½ cables east-north-eastward of Kassār al Mitma and 6¾ miles west-south-westward of No. 7 light-beacon.

A single-pile beacon, No. 5, surmounted by a square, marks the extremity of the sandy spit about 2 miles eastward of Jazīrat al Maqta‘.

Anchorage. — Wharf. — Beacons. — Buoy. — Bandar Misha‘āb affords anchorage on the southern side of the shoal bank extending eastward from Jazīrat al Maqta‘; it is entered between No. 5 beacon and No. 6 light-beacon described above.

A detached steel and timber wharf, 405 feet ($123^{m}4$) long and 74 feet ($22^{m}6$) wide, lies in a north-easterly and south-westerly direction, about 4½ miles southward of Ras al Misha‘āb and 1¾ miles offshore ; it is connected with the shore south-westward by an aerial cableway supported on wooden towers. A causeway, about 3½ cables in length, which has a **T**-head, 200 feet ($61^{m}0$) long, with a depth of 6½ feet ($2^{m}0$) alongside, extends north-eastward from the shore about 5 miles southward of Ras al Misha‘āb.

Within the entrance, a fairway buoy, painted black and white in vertical stripes, is moored about 3½ cables north-eastward of the entrance to the channel leading to the anchorage and wharf, and 1¾ miles southward of No. 5 beacon. The channel, in which there is a least depth of 24 feet ($7^{m}3$), is marked by four three-pile beacons, Nos. 4 and 2 on the eastern side are each surmounted by a yellow ball and Nos. 3 and 1 on the western side by a yellow square.

Good sheltered anchorage may be obtained, in a depth of about 5 fathoms ($9^{m}1$), mud and sand, with the cable tower on the wharf bearing about 286°, distant about 5 cables.

The wharf will accommodate two vessels, in depths of 29 feet ($8^{m}8$) alongside ; under no circumstances should a vessel pass south-westward of the wharf (*Lat. 28° 07′ N., Long. 48° 39′ E.*).

Pilotage.—A vessel requiring a pilot should send a request by radio, through Bahrein, stating the estimated time of her arrival at Ras at Tannūra anchorage where the pilot will board ; if 72 hours' notice is given, arrangements will be made, if possible, for a pilot to board the vessel at the Bahrein light-vessel. Strangers are advised to employ a pilot for entering Bandar Misha‘āb.

Charts 2847, 3960.

Directions.—From a position northward of Jazīrat Fārsi, a vessel should navigate with caution so as to pass about 1¾ miles northward of No. 8 light-beacon and 1¾ miles north-north-westward of No. 7 light-beacon ; thence she should steer 235° for about 11½ miles for the fairway buoy, passing about 1¼ miles north-westward of No. 6 light-beacon. From the fairway buoy she should steer 210° through the channel leading to the anchorage, passing westward of Nos. 4 and 2

Charts 2847, 2858, 748b.

Charts 2847 and 3960.

beacons, and eastward of Nos. 3 and 1 beacons. Thence she should steer 263° for about 12 cables to the anchorage, or 270° to the wharf.

The above track is indicated by a firm line on chart 3960.

Vessels should pass through the area between Jazīrat Fārsi and No. 9 beacon in daylight only, and should arrive off Jazīrat Fārsi before daybreak, the light on that islet being more easily seen than is the islet itself by daylight.

Port facilities.—There is a Medical officer at Bandar Misha'āb and limited hospital accommodation.

Chart 2847.

COAST OF KUWAIT.—Buoy.—The coast proper of Kuwait extends from a position about 2 miles southward of Ras al Qalīya, situated about 45 miles north-north-westward of Ras al Misha'āb, to the junction of Khōr as Sabīya (page 241), and Khōr Shetana, but that part between a position about 3 miles north-westward of Ras al Misha'āb and the boundary of Kuwait proper is jointly owned by the Sultan of Kuwait and the King of Nejd and is known as the neutral zone.

Charts 2847, 1265.

Between Ras al Misha'āb and Kita at Araifiyan, situated about 4 miles offshore, 52 miles north-north-westward, the coast may be approached to a distance of about 6 miles, and between Kita at Araifiyan and Ras al Ardh, on the western side of the entrance of Kuwait harbour, about 23 miles farther north-north-westward, it may be approached to a distance of about 2 miles. There are several off-lying islets, within which the depths are irregular and soundings afford but little guidance; off the northern part of the coast of Kuwait, there is an extensive flat (*see* page 234). In depths of less than 8 fathoms ($14^{m}6$), the bottom is of sand or rock, but in greater depths it is of mud. Between Ras al Misha'āb and Kuwait harbour, there is shelter for only very small boats from winds from northward and north-westward that blow during a shamāl, and from the considerable sea that these winds raise.

The tidal streams set north-north-westward and south-south-eastward along the coast, and are strong.

Chart 2847.

The coast between Ras al Misha'āb and Ras al Khafji consists of low sand hills. About 11 miles north-north-westward of Ras al Misha'āb is Dōhat al Asli, a shallow bay. Ras al Khafji is a sandy point, off the northern side of which there is an islet ; the coastal reef extends about one mile from the point. About 5 miles north-north-westward of Ras al Khafji is Ras Bard Halq, a low, white and sandy point, from which a spit extends about one mile north-eastward. About 4½ miles farther north-westward is Hadd al Hamāra, a small sandy spit, under the lee of which boats may obtain shelter.

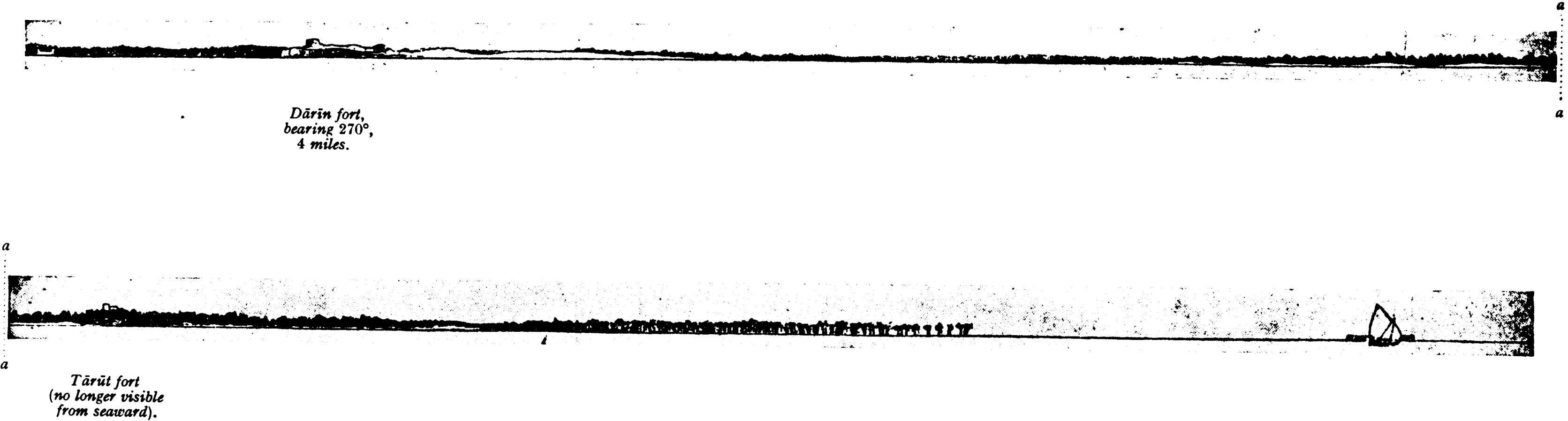
Jabal Banna, about 10 miles north-westward of Ras Bard Halq and one mile inland, rises to an elevation of from 70 to 100 feet ($21^{m}3$ to $30^{m}5$) ; it is small, saddle-shaped and dark ; the coast in the vicinity consists of low white sand hills. *See* view facing page 230.

Chart 1223, plan of Az Zaur anchorage.

About 2 miles northward of Jabal Banna is Khōr al A'ma, a small inlet frequented by fishing boats, and about 5 miles farther northward

Charts 2858, 748b.

To face page 230.

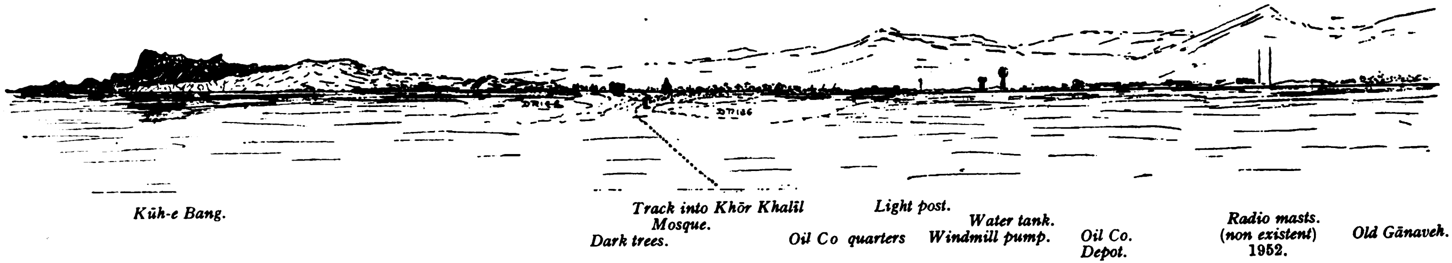


View, in two parts of Jazīrat Tārūt from eastward.

(*Original dated* 1908.)

Jabal Banna,
bearing 257°,
5 *miles.*
(*Original dated prior to* 1860.)

To face page 231.


Kūh-e Bang.
Track into Khōr Khalīl
Mosque.
Dark trees.
Light post.
Oil Co quarters
Water tank.
Windmill pump.
Oil Co.
Depot.
Radio masts.
(non existent)
1952.
Old Gānaveh.

Coast in the vicinity of Gānaveh villages from about 4 miles southward of the light-post.

(*Original dated* 1924.)

Chart 1223, plan of Az Zaur anchorage.

is Ras az Zaur, the extremity of a low sandy projection, from which a spit extends about 3¼ miles north-eastward.

A conical buoy, painted black and white in horizontal bands, is moored about 2 miles east-south-eastward of the entrance to Khōr al A‘ma.

Chart 2847.

Off-lying dangers and banks.—Beacon.—Al Kumrah is a pearl bank, with depths of 8 fathoms (14^{m}6), situated about 17 miles north-eastward of Ras al Misha‘āb (*Lat. 28° 12′ N., Long. 48° 38′ E.*). A 12-foot (3^{m}7) patch lies on its south-western part.

In 1949, an area of breakers, about half a mile in extent, was reported about 23 miles east-north-eastward of Ras al Khafji ; the area was stated to be visible in daylight from a distance of about one mile, and to have the appearance of dark and light patches.

In 1908, breakers were reported about 12 miles east-north-eastward of Ras al Khafji.

A reef about a quarter of a mile in extent, eastward and westward, with depths of less than 6 feet (1^{m}8), lies about 16½ miles north-eastward of Ras al Khafji.

Umm al Marādim, about 14 miles east- south-eastward of Ras az Zaur, is a sandy islet, about 20 feet (6^{m}1) high, covered with brushwood, and steep-to at the edge of its fringing reef, which, except on its southern side, extends about half a mile offshore. A stone beacon, about 10 feet (3^{m}0) in height, stands on the north-eastern part of the islet. A shoal with a depth of 12 feet (3^{m}7), was reported in 1950, to lie about 1¾ miles south-eastward of Umm al Marādim. A reef, with a depth of less than 6 feet (1^{m}8), is situated about 2 miles north-north-westward of Umm al Marādim.

Chart 1223, plan of Ras az Zaur anchorage.

A shoal, that dries, lies about 2 miles offshore, 3½ miles south-eastward of the entrance to Khōr al A‘ma.

Detached shoals, with depths of less than 6 fathoms (11^{m}0), lie within 6¾ miles south-eastward of Ras az Zaur.

Chart 1265.

Coast.—Dangers.—Light.—Buoy.—Dōhat az Zaur, entered between Ras az Zaur and Ras al Qalīya, is encumbered with shoal patches, some of which lie as much as 4 miles offshore.

Ras Qalīya is low, and from it a spit, with depths of less than 18 feet (5^{m}5), extends about 3½ miles north-eastward. Kita at Araifiyan, which is marked on its eastern side by a white can buoy surmounted by a rectangle between two pieces of piping, lies about 6½ miles northward of Ras al Qalīya and about 4 miles offshore ; it is a small detached, steep-to reef which is nearly awash.

Between Ras al Qalīya and Ras al Ardh the coast is a low stony desert, brownish in colour ; a few miles inland are hills from 200 to 300 feet (61^{m}0 to 91^{m}4) high. About 3 miles north-westward of Ras Qalīya is a square hillock, which in appearance resembles a fort and rises to an elevation of about 50 feet (15^{m}2) ; it is known as Jilaat al Abid, and on it are the ruins of an old tower ; along the coast northward of this hillock are four forts or villages, the whole being known as Al Qasur.

Chart 1223, plan of Mina al Ahmadi.

A light is exhibited, at an elevation of 51 feet (15^{m}5), from a black

Charts 2858, 748b.

Chart 1223, plan of Mina al Ahmad.

pylon situated about three-quarters of a mile southward of Ash Shu'aiba (*Lat. 29° 03′ N., Long. 48° 09′ E.*), the southernmost of the four forts.

Ash Shu'aiba is situated about 1½ miles north-westward of Ras Qalīya, is a small square fort standing on the coast. The beach in its vicinity is sandy, but at low water the landing is indifferent; near the fort is a date plantation.

Mina al Ahmadi.—Lights.—Fog signal.—Radio station.—Jetty.—Mooring buoys.—Port facilities.—Caution.—Mina al Ahmadi (Fahailīl) is situated about 2½ miles northward of Ash Shu'aiba.

Chart 1265.

A coastal radio station is situated about 3¾ miles west-north-westward of Mina al Ahmadi. Some oil tanks, with an elevation of 435 feet ($132^{m}6$), lie about three-quarters of a mile south-westward of the radio station.

Four prominent tanks, which from seaward appear as one, are situated about 3 miles west-south-westward of Mina al Ahmadi.

Chart 1223, plan of Mina al Ahmadi.

About midway between Ash Shu'aiba and Mina al Ahmadi there is a large oil and cargo T-headed jetty which projects eastward from the coast for nearly 7 cables. The northern part of the T-head provides six oil-loading berths for large vessels in deep water, four vessels being berthed on the outside, and two on the inside, of the arm; each berth is provided with derricks for handling the loading hoses. Vessels can berth here by day and at night. In addition there are two berths at the sea terminals of submarine pipe lines, situated one southward and one northward of the jetty.

The southern part of the T-head, which is equipped with two 6-ton travelling cranes and a derrick of 60 tons capacity, provides two berths for vessels of any size, one on each side of the arm. Vessels can berth here by day only. A fog signal is sounded from the southern end of the pierhead (*Lat. 29° 04′ N., Long. 48° 10′ E.*).

The jetty and the T-head are flood-lit by light-standards at intervals, and the heads of the derricks are also illuminated; in addition, lights are exhibited from the heads of two metal framework towers, each 75 feet ($23^{m}0$) high, situated one at each end of the cargo section of the T-head.

A light is exhibited, at an elevation of 158 feet ($48^{m}2$), from a position about 9 cables north-westward of the root of the jetty.

A radio beacon has been established about 2½ cables east-north-eastward of the above light-structure.

Three mooring buoys, painted red and white horizontally, lie northward of the wharf; a similar buoy lies southward of the wharf.

Adjoining the southern side of the root of the jetty there is a small boat harbour protected by two stone breakwaters between which there is an entrance of 440 feet ($134^{m}1$) wide. On the shoreward side of the boat harbour there is a quay for the use of lighters and, on the inside of the northern breakwater, there is a T-headed pier providing berths for numerous tugs.

Two lights are exhibited, one from close within the root of the jetty, and one from the western side of the boat harbour; twin

Charts 2847, 2858, 748b.

Chart 1223, plan of Mina al Admadi.

chimneys stand about one cable north-north-westward of the former light-structure.

Ocean-going tugs and harbour tugs are available.

There are a number of lighters with capacities of from 180 to 500 tons.

Fresh provisions and supplies can usually be obtained. Fuel oil is available, but fresh water is in short supply.

A hospital, maintained by the oil company, with 44 beds for Europeans, is situated about 13 miles from the port.

At least 48 hours before arrival a vessel should report to " Marine Kuwait," through the radio station near Mina al Ahmadi, the following information :—

Expected time of arrival at Mina al Ahmadi, to be confirmed 12 hours before arrival.

Last port of call.

Whether the vessel has a clean bill of health.

Any sickness on board and whether medical attention is required.

Chart 22.

Coast.—Dangers.—Light.—About 2½ miles northward of Mina al Ahmadi lies Abu Hulaifa, a small fort, near which there are a few date palms. Fantās, the northernmost of the four villages, referred to above, is situated about 2½ miles northward of Abu Hulaifa, and has a small date grove.

About 3½ miles north-north-westward of Fantās there is a conspicuous tree standing about half a mile inland. Sirra, a hill fort about 5 miles westward of Ras al Ardh (*see* below), is a small, square, prominent structure, standing at an elevation of about 180 feet ($54^{m}9$).

A small patch, over which there is a depth of 1¼ fathoms ($2^{m}3$), rock, lies about three-quarters of a mile offshore, 7½ miles southward of Ras al Ardh. Kola, a steep-to patch with a depth of 6 feet ($1^{m}8$), rock, lies about 8 cables offshore 3½ miles southward of Ras al Ardh.

A shoal, with a depth of 2 fathoms ($3^{m}7$) over it, lies about 6 cables offshore and about 2 miles southward of Ras al Ardh ; a 2½ fathom ($4^{m}6$) patch lies about one quarter of a mile north-north-eastward of this shoal.

Ras al Ardh, the southern entrance point of Kuwait harbour, is low and sandy ; it is reported to have extended considerably since the first survey of 1821–9 ; a bank, with depths of 2 fathoms ($3^{m}7$), extends about 2 cables north-eastward from it. During a kaus, a very heavy sea breaks on the point. At springs, the tidal streams off the point are strong.

A light is exhibited, at an elevation of 36 feet ($11^{m}0$), from a black stone pyramidal beacon, situated on the extremity of Ras al Ardh (*Lat. 29° 21′ N., Long. 48° 06′ E.*).

Chart 1265.

Outlying dangers.—Light-float.—Light.—Tidal streams.—Jazīrat Qārū, 27 miles eastward of Ras al Qalīya, is a sandy islet, about 3 feet ($0^{m}9$) high, on which are some tufts of grass. A spit extends about half a mile northward from the islet. Birds frequent the islet in large numbers, and, during the season, it is covered with their eggs and young.

A small, detached, steep-to reef, on which the sea breaks at low

Charts 2847, 2858, 748b.

Chart 1265.

water, lies about 1¼ miles north-north-westward of Jazīrat Qārū. The depths in the vicinity of the islet and of the reef are no guide to their proximity, and they should be carefully avoided at night.

Madaira reef consists of two coral patches, about 8½ cables apart, lying about 6½ miles northward of Jazīrat Qārū ; there is a depth of 3 feet (0^{m}9) over the south-eastern patch, and of 5 feet (1^{m}5) over the north-western one, and they are steep-to. In fine weather the presence of the reef is only indicated by slight overfalls in its immediate vicinity, though in bad weather it probably breaks.

A light is exhibited, at an elevation of 40 feet (12^{m}2), from a black light-float with a red tower, moored about three-quarters of a mile south-eastward of Madaira reef. This light-float is fitted with a radar reflector.

Taylor rock, about 17½ miles east-north-eastward of Ras al Qalīya, is a small coral patch, with a depth of 9 feet (2^{m}7) ; in fine weather there is no indication on the surface of its presence, but in bad weather it probably breaks.

Chart 22.

Jazīrat al Kubr, about 18 miles eastward of Ash Shu'aiba, is a sandy islet, about 8 feet (2^{m}4) high, overgrown with brushwood ; a reef extends 1½ cables southward, 3 cables eastward, and one cable northward from the islet, and a narrow rocky spit, on which the sea breaks in bad weather, extends about 6 cables north-westward from it. A detached 1½-fathom (2^{m}7) patch lies about 6 cables westward ; and a detached rocky patch, with depths of less than 6 feet (1^{m}8) over it, lies about 6 cables northward of the islet.

A light is exhibited, at an elevation of 91 feet (27^{m}7), from an iron, framework structure, painted black and white in horizontal bands, situated on Jazīrat al Kubr.

Anchorage may be obtained, in a depth of 11 fathoms (20^{m}1), about half a mile south-south-eastward of Jazīrat Kubr, but the islet does not afford shelter from the shamāl. In fine weather, landing on the south-western side of the island is good.

The tidal streams in the vicinity of the foregoing dangers set north-westward and south-eastward, and at springs attain a rate of about 1½ knots.

Charts 22, 1265.

KUWAIT AND APPROACHES.—Dangers.—Beacon.—The fairway in the approach to Kuwait harbour lies between the coast southward of Ras al Ardh and Abu Jezza, an extensive flat which extends from 35 to 40 miles south-eastward from the coast north-eastward of the entrance of the harbour. Over the south-eastern end of this flat there are depths of from 6 to 9 fathoms (11^{m}0 to 16^{m}5), but there are depths of less than 6 fathoms (11^{m}0) within 33 miles of the coast.

Chart 22.

Jazīrat Failaka lies on an extensive flat of mud, sand, and rock on the eastern side of the approach, with its western extremity about 10 miles north-eastward of Ras al Ardh (*Lat. 29° 21′ N., Long. 48° 06′ E.*) ; it is very low, but there is a clump of trees in the centre of the island. The highest part of the island is a small mound, about 30 feet (9^{m}1) high, on the south-western side, about half a mile eastward of its

Charts 2847, 2858, 748b.

Chart 22.

western extremity, and on which there is a small but conspicuous tomb. Az Zaur is a village, the only inhabited part of the island, near the middle of its north-western side ; near the village is a small date grove. Native boats anchor on the flat off the tomb, and shift round the point on which it stands according to the direction of the wind. The island is healthy. Off the north-western side of the island there are depths of from 2 to 6 feet ($0^{m}6$ to $1^{m}8$), and there is good landing for boats at all states of the tide, especially at Az Zaur.

Jazīrat Auha, a sandy islet covered with scrub, about 8 feet ($2^{m}4$) high, lies about 2 miles south-eastward of the south-eastern extremity of Jazīrat Failaka. There is a cairn about 6 feet ($1^{m}8$) high, on the southern side of the island ; in the centre of the island there is the stump of a mast, about 20 feet ($6^{m}1$) in height.

Ras al Yahi, a rocky patch which dries 2 feet ($0^{m}6$), lies on the eastern extremity of the flat surrounding Jazīrat Failaka, about 1½ miles north-eastward of Jazīrat Auha. Soundings give no warnings of its proximity when approaching from northward or eastward and caution is therefore necessary in its locality. The depths are shoal between Jazīrat Auha and Ras al Yahi and also between them and Jazīrat Failaka.

Dhārub is an extensive mud flat extending south-eastward from the entrance of Khōr as Sabīya (page 241).

Mashjang, a sandy islet about 10 feet ($3^{m}0$) high, lies on Dhārub about 1¾ miles north-westward of the north-western extremity of Jazīrat Failaka.

Kuwait harbour.—Dangers.—This harbour is situated in a bay, between Ras al Ardh and a point about 12 miles north-north-eastward; its southern shore is indented by three bights, in which the depths are for the most part very shallow. The northern shore is low and is fringed by a mud flat, which, with depths of less than 3 fathoms ($5^{m}5$), extends as much as 5 miles from the eastern part. North-westward of the bay is the Aghthi country, the hills of which are probably from 200 to 300 feet ($61^{m}0$ to $91^{m}4$) high, and are dusky brown in colour, with a level summit ending abruptly on its seaward side in cliffs. The whole of the surrounding country is elsewhere a desert of white sand.

The shamāl raises a considerable sea in the southern part of the bay, but insufficient to distress a large vessel, though a heavy swell gets up quickly, making boatwork very difficult. The kaus also causes a swell in the harbour, much greater than would be expected from the strength of the wind.

The bight between Ras al Ardh and Ras 'Ajūza, about 5½ miles west-north-westward, is almost filled with a bank, with depths of less than 3 fathoms ($5^{m}5$), the outer edge of which lies about 6 cables outside the imaginary line joining those points; there is, however, a narrow channel, in which the depths are from 7 to 11 fathoms ($12^{m}8$ to $20^{m}1$), running in close to the shore westward of Ras al Ardh. A patch, with a depth of 3 feet ($0^{m}9$) over it, lies near the end of the bank north-westward of the entrance of this narrow channel, in a position about 8 cables north-westward of Ras al Ardh (*Lat. 29° 21′ N., Long. 48° 06′ E.*). In 1944, this bank was reported to have extended northward in a position about 2 miles north-westward of Ras al Ardh.

Charts 1265, 2847, 2858, 748b.

Charts 1213, 22.

Port of Kuwait.—Dangers.—Buoys.—Lights.—Beacon.—Signal Station.—The port of Kuwait lies in the eastern part of the large bight on the southern side of the harbour entered between Ras 'Ajūza and Ras 'Ashairiq, about 8 miles westward. Dōhat Abu Tala, the head of this bight, is filled with extensive sand and mud flats which dry. The town of Kuwait stands on the eastern shore of the bight close south-westward of Ras 'Ajūza.

In 1953, dredging operations were in progress. Vessels should give at least 24 hours notice of arrival to the Port Superintendent.

Chart 1213.

Ras 'Ajūza is low, and from it a rocky flat, which dries as much as 6 feet ($1^{m}8$), and has fish weirs on it, extends about 3½ cables northward ; a bank, with depths of less than 3 fathoms ($5^{m}5$), extends about 11 cables northward from this flat, terminating in a spit, with a depth of 2¾ fathoms ($5^{m}0$). In 1944, this bank, was reported to have extended about 1½ cables westward. A red can buoy is moored about 1¼ cables north-north-eastward of the spit, about 1½ miles northward of Ras 'Ajūza. A shoal, with a depth of 3¼ fathoms ($5^{m}9$), lies about 5½ cables east-north-eastward of the 2¾-fathom ($5^{m}0$) shoal.

A light is exhibited, at an elevation of 60 feet ($18^{m}3$), from the Shaikh's house, about 3¼ cables west-south-westward of the extremity of Ras 'Ajūza.

A light is exhibited, at an elevation of 55 feet ($15^{m}8$), from the roof of the British Agency, about half a mile westward of Ras 'Ajūza.

A conspicuous grey water tower, about 40 feet ($12^{m}2$) in height, stands close eastward of the Shaikh's house.

A small jetty, with a depth of 2 feet ($5^{m}6$) at its head, extends about one cable eastward from the coast about 4¼ cables southward of Ras 'Ajūza.

Fasht al Hadiba (Hadaibah), on the western side of the approach to Kuwait, is a rocky patch, with a depth of 1¾ fathoms ($3^{m}2$) over it, lying about 2¼ miles north-westward of Ras 'Ajūza ; it lies at the north-eastern end of a shallow spit extending about 3 miles from the north-eastern part of Al 'Akāz. In 1944, the bank on the southern side of Fasht al Hadiba was reported to have extended one cable southward.

A black conical buoy is moored on the eastern side of Fasht al Hadiba ; vessels with a draught of more than 10 feet ($3^{m}0$) should not pass over any part of the reef westward of this buoy.

The seaward end of the dredged channel to Bandar ash Shuwaikh is marked by starboard and port hand buoys, situated about 1½ miles north-westward of the British Agency (*Lat. 29° 23′ N., Long. 48° 00′ E.*).

Al 'Akāz is an extensive reef lying about 1½ miles westward of the southern part of Kuwait town ; its southern part dries, and over its northern part the depths generally are about 2 feet ($0^{m}6$), though there are some rocky patches which dry from one to 3 feet ($0^{m}3$ to $0^{m}9$).

Jazīrat Qurain (Kurein) is an inconspicuous barren islet on the southern side of Al 'Akāz, with a peak, 30 feet ($9^{m}1$) high, at its southern extremity.

A beacon, consisting of a stepped truncated cone, 35 feet ($10^{m}7$) in height, painted black, stands on the summit of Jazīrat Qurain.

For a distance of about 8 cables off the frontage of Kuwait town

Chart 1213.

there are depths of less than 2 fathoms ($3^{m}7$), and the beach dries out for a considerable distance, though at high water the sea washes up to the houses ; the native boats are hauled up on the beach inside substantial breakwaters constructed of loose stones. A short distance south-westward of the town there are some white sand hills.

A light is exhibited on the eastern side of the north-eastern entrance to a boat harbour that is situated opposite the Port offices about half-way along the waterfront.

A signal station is situated on the roof of the Port offices. Vessels can communicate, by day, by means of the International Code of Signals, and, at night, by flashing lamp.

Red obstruction lights are exhibited from each of two radio masts, 105 feet ($32^{m}0$) in height, situated about one cable apart, about 2 cables southward of the large, square water tank in the centre of the town ; and also from the many water towers in and around the town (*Lat. 29° 23′ N., Long. 47° 59′ E.*).

The channel leading from the anchorage to Bandar ash Shuwaikh, as far as the bar, is 500 feet ($152^{m}4$) wide, with a least depth of 19 feet ($5^{m}8$). The axis of the channel is indicated by the beacon on Jazīrat Qurain, bearing 223½°. The western side of the channel is marked by three barrel buoys painted black and white, in vertical stripes, and numbered 1, 3 and 5 from seaward ; and its eastern side by three buoys painted red and numbered 2, 4 and 6 from seaward; No. 2 is conical and Nos. 4 and 6 barrel buoys.

The passage over the bar has a least depth of 11 feet ($3^{m}4$). Its western side is marked by two conical light-buoys, painted black and white in vertical stripes, numbered 7 and 9 from seaward, and each exhibiting a *green quick flashing* light; and its eastern side by two conical light-buoys painted red, numbered 8 and 10 from seaward, and each exhibiting a *red quick flashing* light.

The channel inside the bar is 500 feet ($152^{m}4$) wide, with a least depth of 19 feet ($5^{m}8$). The axis of the channel is indicated by two concrete leading beacons, 18 feet ($5^{m}5$) in height, painted black, and each exhibiting three *red* lights, disposed vertically. These beacons are situated on the southern shore of the harbour about 1¾ miles eastward of Jazīrat Qurain, and in line bear 196°.

The southern end of the inner part of the channel is marked by the Inner Turning conical light-buoy, painted red and exhibiting a *red flashing* light, moored close eastward of the alignment of the light-beacons, and on the centre line, 058° and 238°, of a basin, 8,000 feet ($2{,}348^{m}4$) long and 1,200 feet ($365^{m}8$) wide, which, in 1954, had been dredged to a minimum depth of 24 feet ($7^{m}3$), except for a small area in the south-eastern corner, where there is a patch with a depth of 15 feet ($4^{m}6$) over it. A large part of this basin has depths of from 24 to 34 feet ($7^{m}5$ to $10^{m}4$) in it.

There are a number of mooring buoys in the basin.

Eastward of the front leading light beacons there is a small radio station with 5 masts 80 feet ($24^{m}4$) in height. Westward of the front leading light beacons there are seven tall chimneys of the generating and water distilling plants. Opposite the generating plant a jetty carrying pipes from the distillation plant extends 527 feet ($160^{m}3$); it may be identified by a square building built of burnished metal plates, and at night two *red* lights mark the extremity of the jetty.

Charts 22, 1265, 2847, 2858, 748b.

Chart 1213.

Vessels are prohibited from going alongside or anchoring within one cable of this jetty.

There are several jetties for boats and local craft in Bandar Ash Shuwaikh (*Lat. 29° 21′ N., Long. 47° 55′ E.*).

Westward of Ash Shuwaikh and southward of Jazīrat Qurain are several large blocks of buildings, including a secondary school, a tuberculosis hospital, and a quarantine hospital.

Anchorages.—A vessel may obtain anchorage, in depths of from 3¼ to 5½ fathoms (5^{m}9 to 10^{m}1), southward of Fasht al Hadiba ; the farther westward that a vessel can anchor in this vicinity, the better shelter she will obtain.

A vessel requiring greater depths should anchor west-north-westward of Fasht al Hadiba, in from 7 to 9 fathoms (12^{m}8 to 16^{m}5), but at this anchorage there is little shelter from the kaus.

Anchorage can also be obtained by a vessel of suitable length and draught in the dredged basin at Bandar ash Shuwaikh. Al Akaz, north-westward of this anchorage and the shoals northward and north-eastward of it, afford little or no protection, and winds from west-north-west, through north, to south-east raise a short breaking sea, which makes boat work dangerous. The holding ground is generally good, though dredging has reduced its efficacy in some places.

Anchorage may also be obtained in Dōhat Kādhima, *see* page 241.

About one quarter of a mile southward of Ras ʻAjūza is the private pier of the Shaikh. There are several landing places in the boat harbour. About one cable westward of the jetty in the basin at Bandar ash Shuwaikh, there is a jetty with landing steps on its eastern side, which can be used at any state of the tide by boats drawing up to 3 feet (0^{m}9).

Pilotage.—Pilotage is compulsory for all except H.M. vessels, and a berth must be obtained from the Harbour Master before entering.

Charts 1213, 22, 1265.

Directions.—A vessel bound for Kuwait harbour and approaching from south-eastward should steer to pass about 10 miles north-eastward of Madaira reef and continue to steer north-westward for about 8 miles into a depth of 10 fathoms (18^{m}3) ; thence she should alter course westward and steer along the southern edge of Abu Jezza flat, keeping in depths between 8 and 10 fathoms (14^{m}6 and 18^{m}3). In clear weather, she should sight Jazīrat al Kubr, and pass about 3 miles northward of it, thence she should steer for Sirra hill fort until within about 4 miles from the coast, when she should steer to pass about 1½ miles eastward of Ras al Ardh. Caution should be exercised as there is usually an indraught towards this part of the coast. In hazy weather, it might be well to continue to close the coast until it is sighted, for it may be approached in safety to a distance of 1½ miles.

A vessel approaching from eastward should steer for a position on Abu Jezza flat and thence westward, being guided by soundings. The clump of date palms on the south-western side of Jazīra Failaka might be visible at a distance of about 9 miles southward.

From a position about 1½ miles north-eastward of Ras al Ardh (*Lat. 29° 21′ N., Long. 48° 06′ E.*), a vessel should steer for a position about one mile east-north-eastward of the buoy off the extremity of the spit northward of Ras ʻAjūza ; thence she should alter course

Charts 2847, 2858, 748b.

Charts 1213, 22, 1265.

gradually south-westward and pass between that buoy and the buoy marking the eastern side of Fasht al Hadiba, and thence to the anchorage.

Chart 1213.

A vessel bound for Bandar ash Shuwaikh should, after passing between the two buoys just mentioned, steer for the beacon on Jazīrat Kurein, bearing 223½°, passing between the three pairs of buoys marking the sides of the outer part of the dredged channel, until close northward of Nos. 7 and 8 light-buoys marking the southern end of the passage over the bar. She should then alter course to 192° to pass between Nos. 7 and 8 light-buoys, and thence between Nos. 9 and 10 light-buoys. From between Nos. 9 and 10 light-buoys, she should steer with the leading light-beacons in line bearing 196°, until close westward of the Inner Turning light-buoy, whence she should steer 238° down the centre of the dredged area to the anchorage.

Vessels are prohibited from anchoring in the dredged channel, but care is necessary on dark nights, as barges and local craft moored offshore in the dredged area at Bandar ash Shuwaikh do not always exhibit lights and are not easy to distinguish.

Charts 1213, 22.

Tidal streams.—The tidal streams in the entrance to the harbour, eastward of Fasht al Hadiba, set about east-north-eastward and west-south-westward, and at springs obtain a rate of from 2 to 3 knots. In Bandar ash Shuwaikh the tidal streams set fairly through the channel.

Chart 1213.

Kuwait town.—This town (*Lat. 29° 23′ N., Long. 47° 59′ E.*), the capital of the State of Kuwait, is one of the most important on the Persian gulf.

Wealth derived from oil revenues is being (1954) spent on completely replanning and rebuilding the town, the face and aspect of which will change from year to year as modern buildings are completed.

Government offices, schools, hospitals, electric generating and water distillation stations, private houses and blocks of flats are all being built in the most modern style. The old town of stone and mud-dried bricks is disappearing, and a new town of re-inforced concrete is rising.

A feature of the aspect of the town from seaward is a dozen or more large square towers all over the area, which are the distributing points for fresh water from the distillation plants.

The Shaikh's palace (the Dasman palace) at Ras ‘Ajūza can be identified by a large circular water tank on a steel framework tower and also by a tall flagstaff. There is a small boat harbour northward of the palace, where there is a large shed with a convex roof.

The Political Agency, north-westward of the Dasman palace, is a two-storey building, with three brick structures on the roof. Close to the Agency is a school which has a square, brick-faced water-tower.

The centre of the town stands on a slight elevation above the remainder ; the highest and most easily distinguished building is a large rectangular water tower, standing well back from the water front.

In the centre of the water front, about 1½ miles south-westward of

Charts 2847, 2858, 748b.

Chart 1213.

the Political Agency (*Lat. 29° 23′ N., Long. 48° 00′ E.*), are the Port and Customs offices ; the former is a two-storied building surmounted by a 40-foot (12$^{\text{m}}$2) signal mast.

Close eastward of the Port office is the Shaikh's Majlis, in front of which is a tall flagstaff.

Trade.—Pearl fishing is now practically extinct. There are, to all intents and purposes, no exports. The chief imports are food of all kinds, machinery, motor vehicles and building materials.

Port facilities.—Sheep can be procured. Fish is plentiful in spring and autumn and can be obtained in small quantities at other seasons. Fresh fruit and vegetables arrive by air two or three times a week.

Water is supplied by water boat.

There are three tugs and a number of lighters, four of which are self-propelled.

Small repairs can be executed. The services of a diver are available.

There is a Government hospital, an American Mission hospital, and a hospital maintained by the Kuwait Oil Company.

Communications.—There is regular steamer communication with Bombay, Karachi and Basra ; and irregular steamer communication with other ports in the Persian gulf.

There is air communication with all parts of the world.

Kuwait is connected with the general telegraph system.

Chart 1214.

Dōhat Kādhima.—Dangers.—Beacon.—Dōhat Kādhima is that portion of Kuwait harbour lying westward of Ras 'Ashairiq (*Lat. 29° 23′ N., Long. 47° 51′ E.*). The shores of the bay are low, sandy, and covered with scrub. The southern shore is fringed by rocky or sandy shoals, on which are many fish traps, extending as much as 1¼ miles offshore.

Jazīrat Umm an Namal, close eastward of Ras 'Ashairiq, is rocky and about 10 feet (3$^{\text{m}}$0) high. A beacon, surmounted by a triangle, 51 feet (15$^{\text{m}}$5) high, stands on the southern side of the island. There is a conspicuous building about 2 cables north-north-eastward of the beacon, but, in 1933, H.M.S. *Fowey* reported that it was not visible from the anchorage off Kuwait in clear weather, at a distance of about 5½ miles.

Kita 'atain Ushairij, about 1½ miles north-north-westward of Ras 'Ashairiq, is a small rock with a depth of 1¼ fathoms (2$^{\text{m}}$3). Kutat Abu Taleh, about three-quarters of a mile west-south-westward of Kita 'atain Ushairij, is a small reef nearly awash ; small 3- and 5-foot (0$^{\text{m}}$9 and 1$^{\text{m}}$5) patches lie, respectively, about half a mile and 1¼ miles south-westward of Kutat Abu Taleh.

All the above-mentioned shoals lie close to or adjacent to the coastal bank, on the southern side of the harbour.

Ras al Kādhima, on the northern shore of Kuwait harbour about 5½ miles west-north-westward of Ras 'Ashairiq, is swampy and only just above water at high tide. About half a mile inland from the north-western shore of Dōhat Kādhima, the ground, sandy and covered with scrub, rises gradually to the foot of a range of hills from 2½ to 3 miles inland ; north-westward of the head of the harbour, these hills attain an elevation of 410 feet (125$^{\text{m}}$0).

North-eastward of Ras al Kādhima, a soft mud flat, which dries

Charts 1265, 2847, 2858, 748b.

Chart 1214.

and makes landing very difficult at low water, extends from 3 cables to over one mile offshore.

Fasht Qushair (Oushair), with a depth of less than 6 feet ($1^{m}8$) over it, lies about 1½ miles offshore, about 5 miles north-eastward of Ras al Kādhima ; with the exception of this reef, the depths on the north-western side of the bay decrease gradually towards the mud flat.

The head of Dōhat Kādhima, westward of Ras al Kādhima, is shallow.

Fasht al Jathir, about 8 cables south-westward of Ras al Kādhima, dries 11 feet ($3^{m}4$) ; there is a boat passage on its northern side leading to the landing place.

Khwesat, about 1½ miles west-south-westward of Ras al Kādhima, is the only landing place at the head of the bay. Jahrā is a village about 1½ miles south-westward of the head of the bay. There is a large white building close westward of the village.

Anchorage.—The outer part of Dōhat Kādhima affords anchorage, in depths of from 5 to 6 fathoms ($9^{m}1$ to $11^{m}0$), for a large number of vessels; it is the only good anchorage for large vessels in the northern part of the Persian gulf, and is sheltered from the shamāl. To reach the anchorage, however, a bank, which extends across the bay and has depths of from 4½ to 5 fathoms ($7^{m}8$ to $9^{m}1$) over it, must be crossed.

Chart 1265.

KUWAIT HARBOUR TO KHŌR 'ABDULLAH.—Dangers.—Buoyage.—Jazīrat Būbiyān, a low barren island, partly covered at high water, lies with Ras al Buraisha (*Lat. 29° 34′ N., Long. 48° 13′ E.*), its southern extremity, about 7 miles north-westward of the north-western extremity of Jazīrat Failaka ; it is separated from the mainland on its western side by Khōr as Sabīya, on its eastern side by Khōr 'Abdullah, and on its northern side by Khōr Būbiyān.

The southern approach to Khōr as Sabīya over Dhārub is encumbered with numerous rocks and dry patches, and is only accessible to boats when the tide is above mean sea level. Sabīya, on the western side of the entrance to Khōr as Sabīya, is a ruined mud enclosure surrounded by tamarisks.

The flat of mud, sand, and rocks, which connects Jazīrat Failaka with the mainland, continues north-eastward as a mud flat extending about 3 miles from the south-eastern side of Jazīrat Būbiyān. Ras al Qaid, about 15 miles north-eastward of Ras al Buraisha, is the eastern extremity of Jazīrat Būbiyān, about 2½ miles southward of which there is a ruined fort.

Charts 1235, 1265.

The entrance to Khōr 'Abdullah lies between Ras al Qaid and Maraqqat 'Abdullah, an extensive bank which dries in patches (*see* page 243), about 10 miles north-eastward. Both shores of the inlet are low alluvial land, covered in places with reeds and grass, and with shallow flats extending a considerable distance from them.

Fasht al Aik, about 6¾ miles east-south-eastward of Ras al Qaid, is a detached bank of hard sand, which dries 3 feet ($0^{m}9$), lying near and within the north-western end of a bank with depths of less than 18 feet ($5^{m}5$), which extends about 4½ miles south-eastward from it. Several detached shoals, with depths of from 14 to 18 feet ($4^{m}3$ to

Charts 22, 2847, 2858, 748b.

Charts 1235, 1265.

$5^{m}5$), lie within about 1½ miles north-eastward and 4 miles south-eastward of Fasht al Aik. Athan shoal, with depths of less than 18 feet ($5^{m}5$), and a least depth of 9 feet ($2^{m}7$) over it, lies with its northern end about 4¾ miles east-south-eastward of Fasht al Aik. Two 18-foot ($5^{m}5$) patches, about 2 cables apart, lie about 2 miles northward of Athan shoal, and several patches, with depths of less than 18 feet ($5^{m}5$), lie close off the northern shore bank northward of Athan shoal. Two shoals, which dry in places, lie between Fasht al Aik and Ras al Qaid. Khōr al Qaid is a channel, with a least depth of about 18 feet ($5^{m}5$), leading north-westward between these shoals.

Within the entrance of Khōr 'Abdullah shoals, with depths of 17 feet ($5^{m}2$) over them, lie about 4¾ miles north-north-eastward, 4½ miles northward, and 5½ miles northward of Ras al Qaid and, about 1½ miles west-north-westward of the last-mentioned shoal and near the fairway, is Kad Atlassi, with a depth of 15 feet ($4^{m}6$) over it.

Khōr 'Abdullah is marked as follows :—

By a red conical buoy, painted in black and yellow horizontal bands, moored about 7 cables north-eastward of Athan shoal ; by a red can bell-buoy moored off the north-eastern side of a detached shoal, with a depth of 14 feet ($4^{m}3$), lying about 8 miles east-south-eastward of Ras al Qaid ; by a can buoy, painted red above black, moored about 4 miles east-north-eastward of Ras al Qaid ; by a red can buoy moored on the south-western side of the khōr about 1½ miles south-south-westward of the southern extremity of Kad Atlassi; and by a can buoy, painted in black and white chequers, moored about 10 miles north-north-westward of Ras al Qaid (*Lat. 29° 48' N., Long. 48° 22' E.*).

Chart 1235, plan of Khōr 'Abdullah.

Above this point the khōr is marked by a black can buoy, a can buoy painted black and yellow in horizontal bands and by four red can buoys.

Jazīrat Warba, mostly low, flat, and covered with reeds and coarse grass, lies northward of Jazīrat Būbiyān, and is separated from it by Khōr Būbiyān. On its northern and north-western sides, respectively, it is separated from the mainland by Khōr Shetana and Khōr Sakaa.

An islet, with a beacon on its eastern side, lies a short distance north-eastward of the eastern extremity of Jazīrat Warba. Warba spit, with depths of less than 10 feet ($5^{m}5$), and which dries 2 feet ($0^{m}6$) near the middle, extends about 2¼ miles eastward of the eastern extremity of Jazīrat Warba, leaving only a very narrow channel into Khōr Shetana with a depth of 19 feet ($5^{m}8$) in it.

Khōr Umm Qasr extends about 4 miles north-westward from Khōr Sakaa to Umm Qasr, on its western bank, where there are the remains of a wharf and a ruined fort, above which it is known as Khōr Zobeir.

Charts 1235, 1265.

Anchorage.—Directions.—Anchorage may be obtained by vessels with local knowledge anywhere in Khōr 'Abdullah above Ras al Qaid (*Lat. 29° 47' N., Long. 48° 22' E.*) according to draught, but vessels should not anchor north-eastward of the pecked line on the chart about 6 miles eastward of Ras al Qaid on account of submarine cables ; *see* page 16.

Anchorage may also be obtained in Khōr Umm Qasr, about 2 miles below the remains of the wharf, but abreast the latter there is very little room.

Charts 2847, 2858. 748b.

Charts 1235, 1265.

Considerable difficulty may be experienced in fixing the position of the vessel in the approach to, and in, Khōr 'Abdullah ; the beacons marking the entrance to the Shatt al Arais are available but can only be identified in the clearest weather.

The navigable channel in Khōr 'Abdullah passes between Maraqqat 'Abdullah, and the shoals extending from it and the coast farther north-westward, on the north-eastern side; and Athan shoal, Fasht al Aik, with the shoals lying off it, and the flats extending from Jazīrat Būbiyān, on the south-western side. Within the entrance vessels should pass north-eastward of Athan shoal and south-westward of Kad Atlassi. A depth of 24 feet ($7^{m}3$) can be carried to within about 2 miles of Jazīrat Warba, thence a depth of 21 feet ($6^{m}4$) can be carried to the channels on either side of that island, but the southern one is not recommended. A depth of 16 feet ($4^{m}9$) can apparently be carried through Khōr Shetana and Khōr Umm Qasr as far as the ruined fort on the western side of the latter.

Tidal streams.—From 3 days' observations, taken in September, 1924, it would appear that, at the northern end of Khōr 'Abdullah (*Lat. 30° 00′ N., Long. 48° 10′ E.*), the out-going tidal stream attains a rate of about 3 knots.

Charts 2847, 2858, 748b

CHAPTER VIII

HEAD OF THE PERSIAN GULF—COASTS OF PERSIA AND ʻIRAQ—RAS ASH SHATT TO, AND INCLUDING, SHATT AL ʻARAB; AND THE TIGRIS AND EUPHRATES.

Chart 2847.

GENERAL REMARKS.—Aspect.—Between Ras ash Shatt (page 150) and Ras Bahrgān (*Lat. 30° 00′ N., Long. 49° 37′ E.*), about 78 miles north-westward, there are no off-lying dangers, but the coastal bank, with depths of less than 3 fathoms ($5^{m}5$), extends from one to 8 miles offshore. The only islands off this coast are Jazīreh-e Khārg and Jazīreh-e Khārgū, situated about 19 miles west-north-westward and 21 miles north-westward, respectively, of Ras ash Shatt. The towns on this coast are small.

The coast generally is low and the mountains, with the exception of Kūh-e Bang, lie some distance inland. This mountain, which is about 985 feet ($300^{m}2$) high, is situated about 42 miles north-north-westward of Ras ash Shatt; its summit lies about 2 miles inland and its seaward face is precipitous; from southward it appears as a remarkable bluff (*see* view D on chart 2847 and view facing page 23). The range, of which Kūh-e Bang is a part, extends, parallel with the coast, for about 12 miles.

About 27 miles eastward of the lighthouse at Bushire there is a mountain ridge, about 4,000 feet ($1219^{m}2$) high, which has summits at either end and near its centre, and the crest of which is deeply serrated. Kūh-e Gīsakān, 5,327 feet ($1623^{m}7$) high, is situated about 18 miles northward of the central summit of this ridge, and rises at the northern end of a range in the crest of which there is a step. (*See* view on chart 27). The land between this range and the coast appears to be low.

A series of ranges, lying from 30 to 40 miles inland, extends northward from Kūh-e Gīsakān; rising behind them can be seen the summits of much higher mountains, which latter are covered in winter with snow.

Kūh-e Tasak, a round-topped mountain, the summit of which is capped with snow in winter, rises to an elevation of about 10,558 feet ($3218^{m}1$), about 44 miles north-eastward of Kūh-e Gīsakān.

Separated from Kūh-e Bang by a valley is a range, about 15 miles inland, which rises to elevations of from 2,000 to 3,000 feet ($609^{m}6$ to $914^{m}4$), but has no prominent peak; its southern end is situated about 26 miles north-eastward of Ras ash Shatt.

A range of hills, lower than the above, trends west-north-westward to a position about 4 miles northward of the head of Dōhat Dīlam, situated about 25 miles north-eastward of Ras Bahrgān, whence it

Charts 2858, 748b.

Chart 2847.

turns north-westward into the interior and decreases in height; this range is the westernmost of the Persian hills, the whole of the head of the gulf being a low alluvial plain. Rising from this range, about 26 miles north-eastward of Kūh-e Bang, is Kūh-e Girgiri, a pyramidal peak, 3,373 feet (1028^{m}1) high. Kūh-e Khami lies about 26 miles north-eastward of Kūh-e Girgiri; it is a great mountain mass of irregular outline lying in an easterly and westerly direction; its summit, which rises to an elevation of 10,460 feet (3188^{m}8), is snow-clad for six months of the year.

Tidal streams.—Southward of Dōhat Dīlam, the tidal streams set northward and southward along the coast; from the head of the bight to Ras Bahrgān (*Lat. 30° 00′ N., Long. 49° 37′ E.*) they set south-westward and north-eastward. The rate is from half a knot to 1½ knots, increasing to from 2 to 3 knots as the mouths of the rivers are approached.

COAST.—Between Ras ash Shatt and Khōr Hilleh Rūd, about 3 miles northward, the coast is low and sandy with tufts of grass in places. Hilleh rūd is formed by the junction of the Shāpūr rūd and Dālakī rūd, about 25 miles inland; Hilleh rūd floods regularly after the melting of the snow in the mountains. The river is navigable by small craft to the village of Hilleh Rūd, situated near a clump of date trees about 6 miles north-eastward of its mouth. The entrance of the river is shallow, and the banks cover at high water.

There are several other inlets on this part of the coast; their entrances are all shallow, but they have greater depths inside.

Chart 2847, plan of Jazīrat Khārg and Jazīrat Khārgū.

Off-lying islands.—Dangers.—Jazīreh-e Khārg is 284 feet (86^{m}6) high near its centre, near which there is a small tomb. Table-topped hills extend northward and southward through the island, and about 3 cables north-eastward of the summit there is another tomb, known as Didabun or Muhammad's Watchman; there are several other similar tombs on the island. The hills at the southern end of the island terminate in precipitous bluffs, and on the southern point are detached table-topped hummocks. Towards the north-western extremity of the island the hills decrease in elevation and terminate in cliffs from 20 to 30 feet (6^{m}1 to 9^{m}1) high. Near the middle of the northern end of the island is a wedge-shaped hill, about 200 feet (61^{m}0) high, close northward of which stood, in 1921, a solitary date tree which showed up well from northward but not so from eastward; except from northward, the hill itself is somewhat prominent. About 4 cables southward of the summit there was, in 1929, a conspicuous date palm; standing entirely alone, it was then unmistakable in clear weather, though it appeared more like a beacon than a date palm.

The western coast of Jazīreh-e Khārg consists of several rocky points, between which are sandy beaches, the hills on that side ending abruptly in cliffs; the eastern coast is sandy. On the eastern side of the island is a cultivated plain terminating in its low, sandy north-eastern extremity on which there is a ruined fort, and near which there is a village. The flagstaff standing nearly half a mile southward of the fort, is difficult to identify as it is only a few feet high, painted black, and attached to the gable end of a house. Twin tombs about one mile south-south-westward of the flagstaff can be easily identified.

Chart 2858, 748b.

Chart 2847, plan of Jazīrat Khārg and Jazīrat Khārgū.

The climate of Khārg is reported to be far less trying in hot weather than that of Bushire.

The island is fringed by a reef which extends from 3 to 5 cables offshore and is steep-to. A sand spit, with depths of from 21 to 36 feet ($6^{m}4$ to $11^{m}0$), extends about 8 cables eastward from the north-eastern extremity. Because of its dark brown colour, the island can seldom be seen on a dark night, though in moonlight it sometimes shows as a white streak, but not until close-to.

There is a small mooring buoy, situated about 3½ cables north-eastward of the Custom house flagstaff (*Lat. 29° 15′ N., Long. 50° 20′ E.*) in the fort; but it is of little use as such, for on the south-going tidal stream there is a race over the spit and the stream attains great strength. Owing to trees in its vicinity, the Custom house flagstaff is difficult to distinguish on certain bearings.

The best landing on Jazīreh-e Khārg at low water is northward of the eastern angle of the ruined fort, where there is a small pier; at high water, landing can be effected anywhere on the beach inside the reef.

Jazīreh-e Khārgū, about 2 miles northward of Jazīreh-e Khārg, is composed of white sand with a thin covering of coarse grass; it is very low, but, in 1909, there was a conspicuous tree standing about a mile from its southern extremity. The island is uninhabited.

Jazīreh-e Khārgū is fringed, except at its northern end, which is steep-to, by a flat reef which extends from 5 to 8 cables offshore, with depths of from 6 to 10 fathoms ($11^{m}0$ to $18^{m}3$) close outside it. From the southern part of this reef a shoal, with depths of 24 and 27 feet ($7^{m}3$ and $8^{m}2$), rock, extends about half a mile south-eastward.

The island cannot be seen at night until dangerously close-to.

In the channel between the two islands, the fairway between the reefs is about one mile wide, with a least depth of 31 feet ($9^{m}4$), but the depths are irregular and the edges of the reefs on either side are steep-to.

The best landing on the island is at its north-eastern extremity.

Anchorage.—The most convenient summer anchorage, sheltered from the shamāl, is on the eastern side of Jazīeh-e Khārg, about 4 cables offshore, in a depth of about 8 fathoms ($14^{m}6$), with the eastern angle of the ruined fort bearing about 320°, distant 5¼ cables. In winter, vessels should anchor farther out, in a depth of about 10 fathoms ($18^{m}3$), so that, should a kaus come on, berth could be shifted to a position north-westward of the north-eastern point, where shelter could be obtained, in a depth of about 7 fathoms ($12^{m}8$), with the eastern angle of the ruined fort bearing 160°, distant about 9 cables. In either position, however, the holding ground is rocky and indifferent, so that, during winter, a vessel should be ready to shift berth to the opposite side of the north-eastern point, which should be effected without delay immediately the necessity for the change has become apparent.

Anchorage off the eastern side of Jazīreh-e Khārg affords good shelter when the outer anchorage off Bushire is untenable owing to bad weather.

Tidal streams.—In the vicinity of Jazīreh-e Khārg and Jazīreh-e Khārgū, the tidal streams set north-westward and south-eastward at a rate sometimes exceeding 2 knots.

Charts 2847, 2858, 748b.

Chart 2847.

Coast.—Anchorage.—Between Khōr Hilleh Rūd and Bandar Rīg, about 20 miles northward, the coast continues low and sandy. Khōr al Qusair, about 11 miles northward of Khōr Hilleh Rūd, is frequented by large boats; near its mouth there is a small village. At Bandar Rīg there is a small creek, fronted by two sandy islets, inside which native boats lie aground at low water.

In 1921, H.M.S. *Cyclamen* anchored off Bandar Rīg, in a depth of 2¾ fathoms ($5^{m}0$), clay, with a white building in the centre of the town bearing 052°, distant 2¾ miles. The bottom shelves gradually towards the coast.

Between Bandar Rig (*Lat. 29° 29′ N., Long. 50° 38′ E.*) and Ganāveh, about 8 miles north-north-westward, the coast is low and sandy.

Ganāveh.—Light.—Anchorage.—Ganāveh (Ganaweh) consists of a group of three villages situated about half a mile inland, at which there are a few date and other trees and a large tomb with a spire. Khōr Khalīl is the tidal mouth of a river which flows into the sea about 7½ miles north-westward of Bandar Rīg. Sands, which dry, extend about 2 cables from the mouth of the river. Large dhows can enter the river at high water.

An Oil Company has an establishment at Khōr Khalīl; the living quarters are situated south-eastward of the entrance ,and farther south-eastward are a water tank, windmill pump, and the depôt buildings.

The approach to Khōr Khalīl is across a bar, over which there are depths of from one to 2 feet ($0^{m}3$ to $0^{m}4$), about half a mile offshore. A small spar buoy surmounted by a brush is established on the eastern side of the channel across the bar, and between it and the mouth of the river, that side of the channel is marked in places by slender poles. Within Khōr Khalīl, the greatest depths are on the starboard hand when entering, and about 2 cables within the entrance is a concrete jetty with steps, which affords good sheltered landing at all states of the tide. *See* view facing page 231.

A light is exhibited, at an elevation of 27 feet ($8^{m}2$), at Ganāveh.

Anchorage may be obtained, in a depth of about 3 fathoms ($5^{m}5$), about 1½ miles offshore south-westward of Ganāveh; the holding ground, of clay and mud, is good; large vessels anchor farther out. At low water, landing on the beach is bad, as several ridges of dry sand, with depths of about 2 feet ($0^{m}6$) inside them, must be crossed.

Coast.—Between Ganāveh and Sabzpūshān, about 3½ miles north-westward of Ganāveh light-structure, the coast continues low and sandy. About one mile north-westward of Ganāveh light-structure, is Haidari, a small village, with a few date palms in its vicinity. Sabzpūshān is a rocky point, rising steeply to hillocks from 40 to 50 feet ($12^{m}2$ to $15^{m}2$) high; on its summit is a tomb which cannot be seen until close inshore. A reef fringes the point and extends about 1½ cables offshore; there is a small watercourse close eastward of the point.

Under the highest part of Kūh-e Bang, a small tomb surmounts one of the coastal hillocks, which are about 50 feet ($15^{m}2$) high, about 10 miles north-westward of Sabzpūshān. Between Sabzpūshān and this tomb there are no reefs extending more than 2 cables offshore.

Khōr Sīni, about 18 miles north-westward of Sabzpūshān, is a small inlet with a depth of about 2 feet ($0^{m}6$) in its entrance, but there are

Charts 2858, 748b.

greater depths within. About one mile south-eastward of Khōr Sīni is Imām Hasan, a small village with a remarkable mosque and some trees near it.

Khōr al Abd, about 4 miles north-westward of Khōr Sīni, and Khōr Lailatain, about 3 miles farther in that direction, are both small. The entrance to Khōr Lailatain is close south-eastward of Ras Tanb, a low sandy point, from which a sand bank, which dries, extends nearly a mile, and depths of less than 18 feet ($5^{m}5$) some distance farther. The land inshore of this sandy coast is swampy for some miles.

About 7 miles eastward of Ras Tanb is Kūh-e Bikas (*Lat. 29° 58′ N., Long. 50° 17′ E.*), a small table-topped hill, 165 feet ($50^{m}3$) high, which is light in colour and has almost vertical sides; in the plain northward of this hill there are several forts and date groves.

Dōhat Dīlam.—Anchorage.—This extensive bay is entered between Ras Tanb and Ras Bahrgān, about 28 miles westward. The shore of the bay is everywhere very low.

Bandar Dīlam, about 7 miles northward of Ras Tanb, is a small town, in which there is a large, prominent, square fort. This fort, in and around which the houses are built, appears when first sighted from seaward as an island.

The coast in the vicinity is merely a strip of rocky land, from 10 to 15 feet ($3^{m}0$ to $4^{m}6$) high. Mud flats, which dry, extend offshore at Bandar Dīlam, and in them there is a small creek, which dries, in which native craft lie. Landing is difficult, even at high water. The bottom is hard sand for about 3 cables offshore, and soft mud farther out.

Anchorage may be obtained, in a depth of about 4 fathoms ($7^{m}3$), soft mud, about 3¼ miles offshore, or in 3 fathoms ($5^{m}5$), clay, about 2½ miles from the town. The anchorage is sheltered from the shamāl, and the kaus does not raise the usual sea and swell, though it blows with strength.

Shāh Abū Shāh, situated on the hillocks at the head of Dōhat Dīlam, about 7 miles north-north-westward of Bandar Dīlam, is a village in which there is a large white-domed tomb. A small creek gives access to the village.

The land westward of Shāh Abū Shāh and of the hills which terminate in Kūh-e Mishun, 822 feet ($250^{m}5$) high, about 27 miles north-eastward of Ras Bahreān, is low across the head of the Persian gulf to Kuwait, about 120 miles south-westward, forming the deltas of the great rivers.

Ras Bahrgān is a very low strip of sand which is nearly covered at high water; inland the country is swampy for many miles and a bank, with depths of less than 18 feet ($5^{m}5$), extends about 5 miles southward from the point. Mud flats, which dry, extend for some miles on either side of the point; eastward of it landing is impossible, the mud being soft for about half a mile offshore. There are two remarkable date groves about 3 miles northward of the point.

Zuhreh rūd.—Beacon.—This river, the lower reaches of which are more commonly called Hindīān rūd, flows into the Persian gulf a few miles north-westward of Ras Bahrgān (*Lat. 30° 00′ N., Long. 49° 37′ E.*). It appears to have several mouths forming a delta but has only one main channel. The principal entrance is very shallow and has been only partially surveyed. The approach to it, through an extensive mud flat, was prior to 1908, marked by poles surmounted by tin cans. Small native craft use the river, but a steam vessel with

Chart 2847.

a draught of 8 feet ($2^{m}4$) has ascended as far as the village of Hindīān. The river is very tortuous and some of the reaches approach within 2 miles of the shore of Dōhat Dīlam.

Shah Mīr Na'amān shrine stands about 5 miles eastward of the mouth of Zuhreh rūd.

A beacon, situated about 2½ miles south-westward of Ras Bahrgān, marks a channel for dhows.

Sīrimeh, about 11 miles north-westward of Ras Bahrgān, is a clump of trees on the low shore; it is a mark for the entrance of Zuhreh rūd, the delta of which latter lies between these trees and the point.

Charts 1265, 1268.

KHŌR MŪSA AND APPROACHES.—Dangers.—Buoyage.—Tide gauge.—Tidal signals.—Beacons.—Lights.—Khōr Mūsa is entered between Ras Tanūb, a low point situated about 18 miles north-westward of Ras Bahrgān, and Bu Sif, about 20 miles west-south-westward of Ras Tanūb. Navigation is restricted by tidal flats, which dry in places, to a comparatively narrow channel near the western shore of the estuary.

Fasht al Muā is a bank of sand and mud, which dries in patches, extending about 11 miles south-south-eastward, 9½ miles southward and 14 miles south-westward from Ras Tanūb. It is separated from the point and the coast eastward of it by Khōr Ghazlān, in which there are depths of about 9 feet ($2^{m}7$). This channel is approached through Khōr Bahrgān, between Fasht al Muā on the western side, and the flats westward of Ras Bahrgān on the eastern side; it is about 3¼ miles wide, with depths of from 9 to 18 feet ($2^{m}7$ to $5^{m}5$). Khōr Ghazlān is connected by a narrow channel with Khōr Wāstah, westward, which has not been surveyed, and which joins Khōr Mūsa about 21 miles northward of Bu Sif (*Lat. 30° 01′ N., 48° 55′ E.*).

About 3 miles west-north-westward of Ras Tanūb, and close eastward of Jazīreh-e Bunneh (page 251), is the mouth of a river or creek with extensive ruins on its banks. The coast north-westward is nearly all covered at high water and has not been surveyed; it is fronted by tidal flats which are intersected by a number of deep channels which also have not been surveyed.

Two spits, with depths of from 21 to 36 feet ($6^{m}4$ to $11^{m}0$), extend southward from the northern side of the shore bank, to positions, respectively, about 17½ miles south-eastward and 19½ miles south-south-eastward of Ras Tanūb. Numerous detached shoals, with depths of less than 36 feet ($11^{m}0$), lie within 30 miles southward of Ras Tanūb, and a 23-foot ($7^{m}0$) patch was reported, in 1950, to lie about 22 miles southward of that point.

The shore bank, with depths of less than 18 feet ($5^{m}5$) extends about 13 miles south-eastward of Bu Sif, and depths of less than 36 feet ($11^{m}4$) are found within 27 miles south-eastward of that point.

Bu Sif is the south-eastern extremity of a low swampy tract intersected by creeks, which extends about 15 miles westward to the mouth of Khōr Bahmishīr (page 281). Khōr Sīlaik, entered close westward of Bu Sif, has a depth of about 6 feet ($1^{m}8$) at its mouth and is reported to connect with Kārūn river (page 281). Khōr Khuwairīn, the entrance to which lies about 7 miles westward of Bu Sif, also connects with Kārūn river, but neither of these has been explored for any distance.

Charts 2858, 748b.

Chart 1268.

The navigable channel of Khōr Mūsa is entered across a bar, lying about 7 miles eastward of Bu Sif (*Lat. 30° 01′ N., Long. 48° 55′ E.*), over which, in 1951, there was a dredged depth of 31 feet (9^{m}4). Within the bar, the channel is about 1½ miles wide. The banks at the entrance to Khōr Mūsa are liable to change. The south-western edge of Fasht al Muā, which forms the eastern side of the channel, is bordered by a chain of sand banks which dry.

"Outer Buoy" light-and-whistle-buoy, painted black, and exhibiting a *white flashing* light *every six seconds*, is moored about 25 miles south-eastward of Bu Sif, and 6 cables southward of the 23-foot (7^{m}0) shoal reported, in 1950.

"Shoal" can light-buoy, painted red and exhibiting a *white flashing* light, *every three seconds*, is moored about 18 miles south-eastward of Bu Sif off the northern side of a 31-foot (9^{m}4) bank.

"Fairway" conical light-buoy, painted red and exhibiting a *white flashing* light, *every three seconds*, is moored about 11½ miles east-south-eastward of Bu Sif.

The channel as far as Qahr an Nakhuda, about 17½ miles northward of Bu Sif, is marked on its eastern side by five conical light-buoys, painted black and numbered 1, 3, 5, 7 and 9 from seaward; No. 1 and 5 each exhibit a *white group flashing* light, showing *three* flashes, *every nine seconds*, No. 3 and 9 each exhibit a *white flashing* light, *every five seconds*, and No. 7 exhibits a *group flashing* light, showing *three* flashes *every ten seconds*.

Chart 1268 and plans.

The western side is marked by 7 light-buoys painted red and marked 2, 4, 6, 8, 10, 12 and 14 from seaward; No. 2, 4 and 6 are can-shaped and the remainder conical; No. 2, 4, 6 and 10 each exhibit a *red flashing* light *every five seconds*, No. 8 exhibits a *red group flashing* light, showing *three* flashes *every nine seconds*, No. 12 exhibits a *red group flashing* light, showing *two* flashes *every nine seconds*, and No. 14 exhibits a *red flashing* light, *every three seconds*.

No. 16 conical light-buoy, painted red and exhibiting a *white group flashing* light, showing *two* flashes, *every five seconds*, is moored on the western side of the anchorage about 1½ miles west-north-westward of Qahr an Nakhuda (*Lat. 30° 18′ N., Long. 48° 55′ E.*).

Above Qahr an Nakhuda the channel is marked on its south-eastern side by No. 11 light-beacon and by three conical light-buoys, painted black and numbered 13, 15 and 17 from seaward; No. 13 and 17 each exhibits a *white flashing* light *every five seconds*, and No. 15 exhibits a *white group flashing* light, showing *three* flashes *every ten seconds*. On its north-western side the channel is marked by Nos. 16, 18, 20 and 22 light-beacons.

A tide-gauge, consisting of an iron framework structure on a platform on which there are two huts, the whole mounted on iron piles, stands westward of the bar about 3½ cables north-westward of No. 4 light-buoy. The structure, about 80 feet (24^{m}4) high and forming an excellent mark by day, is surmounted by a white dial, about 15 feet (4^{m}6) in diameter, from which day tidal signals are indicated; night tidal signals are indicated by *white*, *red* and *green* lights exhibited above the dial.

Three small triangular beacons, about 12 feet (3^{m}7) high, stands near the eastern side of the bar.

Charts 2847, 2858, 748b.

Chart 1268 and plans.

Jazīreh-e Bunneh, the eastern extremity of which lies about 3 miles west-north-westward of Ras Tanūb, is a low island, on which there is a ruin. Darā, about 5 miles south-westward of Jazīreh-e Bunneh, and separated from it by Khōr Wāstah, is a low island, and in places swampy.

About 6½ miles north-westward of Darā, and on the edge of the eastern shore bank of Khōr Mūsa, is an extensive rocky shoal which dries 7 feet ($2^{m}1$). About 1¾ miles north-north-westward of this shoal, and in the middle of the fairway is Qassār bin Siswān, a rocky shoal, with a least depth of 4 feet ($1^{m}2$); it is marked by No. 9 light-buoy, and the main channel lies on the western side of it. Qabr an Nākhuda, a low islet, lies on the flat on the eastern side of the channel, about 6½ miles north-north-westward of Qassār bin Siswān.

Above Qabr an Nakhuda the left bank of Khōr Mūsa is well defined and always above water.

Chart 1265, with plan of Khor Musa anchorage.

Khōr Qanāqeh extends westward from abreast Qabr an Nakhuda. Within its entrance its banks are steep-to, but there are flats on either side of its mouth.

Khōr Qanāqeh can be ascended about 5 miles above its junction with Khōr Mūsa by keeping in mid-channel; farther up, the channel becomes too narrow for a vessel of any length to turn.

Chart 1268 and plans.

Khōr Dōraq, about 15 miles above Qabr an Nakhuda, trends north-westward and is somewhat tortuous in its lower reaches, above which it trends northward and probably connects with Kārūn rūd.

The main channel continues east-north-eastward for about 5 miles and thence, under the name of Khōr Ma'shūr, trends about 5 miles north-eastward.

Chart 1268.

Anchorage.—Directions.—Tidal streams.—The tidal streams set north-north-westward and south-south-eastward, turning about the times of high and low water, respectively. The greatest rate observed, in February, 1922, was 1½ knots.

Caution should be exercised when passing Qassār bin Siswān, for the out-going tidal stream there attains a rate of about 3 knots and causes eddies and tide-rips over the shoal.

The most difficult part of Khōr Mūsa, especially when the tidal streams are strong, is reported to be at its junction with Khōr Wāstah (*Lat. 30° 23′ N., Long. 48° 56′ E.*).

Chart 1265, plan of Khor Musa anchorage.

Anchorage may be obtained off the entrance to Khōr Qanāqeh with Qabr an Nākhuda bearing 095°, distant three-quarters of a mile.

Chart 1268.

Pilotage.—Pilot vessel.—Fog signal.—Radiobeacon.—A pilot vessel is stationed between " Outer buoy " and " Fairway " light-buoys. The vessel is painted white with the name " Khor Musa " in black on her sides, and has two masts and a yellow funnel; when absent from her station she is replaced by a tug. Pilots, including a chief pilot or Harbour master, are available; the chief pilot takes charge when nearing Bandar Shāpūr and berths all vessels.

Pilotage is compulsory except for H.M. ships and local small craft.

During periods of low visibility, due to fog, dust or sandstorms,

Chart 1268.

the pilot vessel will, in addition to the appropriate signals under such conditions, sound the letters P.V. in Morse code on the steam siren every fifteen minutes, beginning at each hour; on the near approach of vessels the signal will be sounded more frequently in order to assist such vessels.

On request, the pilot vessel will function as a radiobeacon, and vessels requiring this service should obtain the exact position of the pilot vessel. This radiobeacon service should be arranged direct by radio contact with the pilot vessel; her call sign is " EPBA."

Chart 1268, plan of Bandar Shapur.

Bandar Shāpūr.—Port facilities.—Light.—Bandar Shāpūr is situated on the seaward edge of an extensive mud flat on the northern side of Khōr Mūsa, about 45 miles from its entrance. It is the southern terminus of the Trans-Persian railway.

Two jetties, both connected with the railway system, front the town. Railway jetty, the western of the two, is about 850 feet ($259^{m}1$) in length and, in 1948, had a charted depth of about 32 feet ($9^{m}8$) alongside; there are berths for two vessels on the outside of this jetty. The eastern jetty is about 1,750 feet ($533^{m}4$) in length with a depth alongside, in 1948, of 25 feet ($7^{m}6$) and provides berths for three vessels on its outer side; the inner side of this jetty, known as Musa wharf, is only suitable for lighters and, in 1947, had a depth of 6 feet ($1^{m}8$) alongside.

Another lighter wharf, known as Bazaar wharf, is situated within the creek on the eastern side of the town.

There are no cranes or other facilities, except lighting, on the two large wharves, but on shore there are two mobile 5-ton cranes and one mobile 12-ton diesel driven crane. Water is obtainable at the large wharves and is supplied from tank wagons, but 48 hours notice is required.

A light (*Lat. 30° 25′ N., Long. 49° 05′ E.*) is exhibited from No. 24 red beacon standing about three-quarters of a cable north-northwestward of the western end of Railway jetty.

The harbour is administered by a Persian Port officer whose authority only covers the shipping interests of the port. A Customs house is situated in the port and is administered by a Director of Customs whose authority extends to Bandar Ma'shūr and Ahwāz.

Local weather.—The rainfall is about 10 inches ($0^{m}3$) annually; it is experienced during the winter months and is usually associated with southerly gales. The shamāl or north-west wind blows throughout the summer months, starting about 0900 daily and dying about sunset. Fog may be experienced during the months of October and November.

Chart 1268, plan of Khor Ma'shūr.

Bandar Ma'shūr.—Buoyage.—Port facilities.—This port lies in Khōr Ma'shūr about 6 miles east-north-eastward of Bandar Shāpūr. There are two berths here, with depths of 32 feet ($9^{m}7$), each consisting of four mooring buoys marking the corners of a rectangle to which vessels up to a length of 550 feet ($167^{m}6$) can secure. The holding ground is poor.

The channel leading from Bandar Shāpūr to the berths is wide, deep and clear; in December, 1942, there was a depth of 45 feet ($13^{m}7$) at each berth. A conical light-buoy, painted black and ex-

Charts 2847, 2858, 748b.

Chart 1268, plan of Khor Ma'shūr.

hibiting a *white group flashing* light, showing *two* flashes *every ten seconds*, is moored on the south-eastern side of the channel about 1½ miles below the berths; a red conical buoy is moored about 1¾ cables east-north-eastward of this light-buoy.

A limited stock of fuel oil is maintained.

Fresh water can be supplied at Bandar Maʻshūr in barges at a rate of 160 tons a day, but it should be chlorinated before drinking, and softened, or evaporated, before being used in boilers.

Fresh meat and vegetables are obtainable in moderate quantities after 48 hours notice has been given.

Two tugs are available to assist in the berthing of vessels.

A pilot will pilot all vessels from Bandar Shāpūr to the berths.

Harbour works were in progress in 1951.

Chart 1265.

SHATT AL ʻARAB.—General remarks.—This important river is formed by the confluence of the rivers Tigris (page 277) and Euphrates (page 280), which takes place at Al Qurna, about 110 miles from the open waters of the Persian gulf. Parallel with, and eastward of the lower half of the Shatt al ʻArab, flows Khōr Bahmishīr (page 281), which forms the outlet to the sea of the Kārūn river (page 281) ; this latter is connected with the Shatt al ʻArab by Hafar channel, an artificial cutting, and the large island thus formed between the Shatt al ʻArab and Khōr Bahmishīr is known as Jazīreh al Khidhr or Jazīreh-e Abādān. Khorramshahr (page 271) is situated on the northern bank of Hafar channel, and the city of Basra (page 273) is on the Shatt al ʻArab, about 19 miles above the entrance of Hafar channel. Abādān (page 268), at which place are the refineries of the Oil Company, is situated on the island of that name on the left bank of the Shatt al ʻArab, about 8 miles south-eastward of Khorramshahr, with Bāwardā (*Lat. 30° 19′ N., Long. 48° 18′ E.*), about one mile below it.

The eastern bank of the Shatt al ʻArab as far up as Khaiyin canal, that is, about 3¼ miles above the entrance of Hafar channel, is Persian; the western bank from the entrance of the river to Khaiyin canal, and both banks above that, are in ʻIraqi territory.

The Shatt al ʻArab is navigable by any vessel able to cross the bar at its entrance as far as Basra (page 273).

Chart 1235.

At the mouth of the river, both banks are very low and are bordered by date palms. Ras al Bisha, the western entrance point, has some small date palms on it, and South Mast beacon, a black structure, 75 feet (22^{m}9) high, stands on the south-eastern extremity of the point; on the opposite bank, about 4 miles north-westward of this beacon, there is an old Persian mud fort. The seaward and lower parts of the banks on both sides of the river are thickly overgrown with reeds and coarse grass; the soil, being a soft alluvial mud, is so soft that it is difficult to land.

Above the entrance, the banks on both sides continue very low to and above Basra, and are intersected by numerous irrigation canals; excepting the bunds enclosing the plantations, the land is often submerged. The belt of land near the river from Fao, situated about 5½ miles above Ras al Bisha, as far, and for a few miles above, Al

Charts 2847, 2858, 748b.

Chart 1235.

Qurna, is exceedingly fertile and produces very fine dates as well as grain, fruit and vegetables of various kinds.

The date groves extend from half a mile to 2 miles from the river bank, but beyond them is desert or swamp. In places the date groves along the banks are interrupted by tracts of uncultivated land. Excellent duck, and snipe shooting may be had along the banks of the river, especially at Fao and above Basra; partridges also are plentiful, and bustard are found in the desert round Basra. The close season for game is from June 1st to October 1st, but sand grouse may be shot at any time of the year.

On the falling tide, the water in the river is fresh, even at Fao, except in the autumn when the river is low and it is then slightly brackish; about 10 miles above Fao the water is at all times fresh.

Chart 1265.

Approaches to Shatt al 'Arab.—Light-vessel.—Dangers.—Buoyage.—Shoals, with depths of from 31 to 34 feet ($9^{m}4$ to $10^{m}4$), lie from 23 to 37 miles south-south-eastward of Ras al Bisha.

Palinurus shoal, with a depth of 18 feet ($5^{m}5$), lies about 22 miles south-eastward of Ras al Bisha, and is marked on its eastern side by a red conical buoy. An 18-foot ($5^{m}5$) patch lies about 2¼ miles southward, and a 26-foot ($7^{m}9$) patch lies about one mile north-westward of Palinurus shoal. Depths of less than 36 feet ($11^{m}0$) lie between Palinurus shoal and the south-eastern edge of Maraqqat Abdullah (page 259). Vessels are warned not to pass between Shatt al 'Arab light-vessel and Palinurus shoal.

A light is exhibited, at an elevation of 32 feet ($9^{m}8$), from Shatt al 'Arab light-vessel, painted red with " Shatt al 'Arab " in white on the sides and a white mast, moored about 3½ miles east-south-eastward of the shoalest part of Palinurus shoal.

A shoal, with a depth of 30 feet ($9^{m}1$), lies about 6 miles eastward of Palinurus shoal. Eastern Shoal conical light-buoy, painted red and white in vertical stripes and exhibiting a *white flashing* light, *every twelve seconds,* is moored on the north-western side of this shoal. Vessels of deep draught should pass westward of the light-buoy. About 1¼ miles north-eastward of this shoal is a bank, with a least depth of 25 feet ($7^{m}6$). Between the latter and the entrance to New channel (page 260) there are several patches, with depths of from 32 to 35 feet ($9^{m}8$ to $10^{m}7$). An 18-foot ($5^{m}5$) patch lies about 15 miles southward of Bu Sif (*Lat. 30° 01′ N., Long. 48° 56′ E.*). Maidān 'Alī is an extensive shallow flat extending from the coast eastward of the entrance to Shatt al 'Arab; the bottom in the approach is mud and sand, the latter predominating towards the land.

A light is exhibited, at an elevation of 15 feet ($4^{m}6$), from a pile structure situated about 7 miles south-eastward of Pile Beacon (*see* below). A number of single piles exist within a mile of this light-beacon.

Charts 3842, 1235.

Pile beacon (old semaphore) is situated on the coastal bank, about 9 miles east-south-eastward of Ras al Bisha. An obstruction was reported, in 1935, to lie about 3¼ miles south-westward of Pile beacon.

A 3-pile beacon stands, in a depth of 18 feet ($5^{m}5$), about 2¾ miles south-eastward of pile beacon.

Rooka can light-buoy, painted black and white in vertical stripes

Charts 2847, 2858, 748b.

Charts 3842, 1235.

and exhibiting a *white flashing* light *every six seconds,* is moored about 5 miles east-south-eastward of Pile beacon. The light-buoy is equipped with a radar reflector.

A can-shaped light-buoy, painted black and yellow in horizontal bands, and exhibiting a *red flashing* light *every three seconds* is moored about 6 miles eastward of the Pile beacon, and marks a spoil ground.

Chart 3844.

Radio station.—There is a radio station at Abādān; *see* page 268.

Charts 3842, 3843, 3844, 1235.

Regulations.—Pilotage.—Special regulations are in force in the port and harbour of Basra, Kabda and Abādān. The following information is for the guidance of vessels approaching from seaward.

Vessels carrying dangerous cargo or explosives, shall inform the harbour master on being boarded.

Vessels proceeding in the same direction are not permitted to overtake or pass each other between Mu 'āvīyeh spit and the Outer Western light-buoy.

The Port of Basra extends up the Shatt al 'Arab from the sea as far as a stone beacon at Nahr 'Umr, about 88 miles from the entrance to New channel. It also includes the jetty at Umm Qasr, the tidal inlet (including the area between high and low water marks) northward of the jetty, and the 'Iraqi waters and foreshore between the jetty at Umm Qasr and the entrance to the Shatt al 'Arab.

Charts 3843, 3844.

For the limits of the Harbour of Kabda, *see* page 268.

The Harbour of Abādān extends from the " Slow " notice-board on the right bank of the river above Khōr Zayadiya (Zayadi creek) to the " Slow " notice-board on the right bank of the river above Seeba (page 269).

The Harbour of Basra extends from Khōr Seraji, about 2 miles below the Custom house at 'Ashār, to the mouth of Qarmat 'Alī, about 5 miles above the Custom house, and includes the waters of all tributary creeks within those limits for a distance of 50 yards ($45^{m}7$) from their junction with the main stream.

The limits of the dredged channels are from a position with Outer New Channel Rear light-beacon " A " bearing 317°, distant 5 cables, and a position with Fao flagstaff bearing 213°, and as defined by buoys and beacons.

With the exception of H.M. ships, those of the Government of 'Iraq, and sailing craft, pilotage is compulsory for all vessels entering, leaving, or navigating the Shatt al 'Arab, but H.M. ships which do not use the channel regularly and frequently should employ a pilot. Pilotage in the river outside the harbour limits of Kabda, Abādān and Basra (*Lat. 30° 30′ N., Long. 47° 50′ E.*) is conducted by river pilots, and within those limits by harbour masters, except in the case of a vessel proceeding through either harbour without stopping when the river pilot will conduct the vessel through it.

Owing to the alterations which are continually taking place, it is essential that H.M. ships should obtain the latest information concerning the available depths in the channels and the traffic and other regulations in force from the pilot vessel before attempting to enter. The exemption from pilotage granted to H.M. ships does not apply to movements within harbour limits ordinarily conducted by harbour

Charts 2847, 2858, 748b.

Charts 3843, 3844

masters. Under no circumstances are vessels under sail permitted to navigate New channel.

Charts 3842, 3843, 3844, 1235.

A steam pilot vessel, painted black with " Pilots " in white letters on her sides, having a yellow funnel and two masts, is stationed about 6 miles east-south-eastward of Pile beacon (*Lat. 29° 50′ N., Long. 48° 43′ E.*). Vessels approaching her from seaward should display their number and then their draught in feet and inches, and a pilot will be sent off. In the event of the pilot vessel being temporarily off her station, the vessel requiring the pilot should anchor there and communicate with the Channel Control Station.

Anchorage is prohibited northward of an imaginary line, indicated on the charts, joining Pile beacon and Rooka light-buoy.

Anchorage is prohibited within the harbour limits of Abādān reach, as indicated by " Slow " notice-boards on the western bank, near any submarine cable, or in any position where the vessel might obstruct the fairway.

Inward bound shipping must not pass northward of an imaginary line, indicated on the charts, joining Pile beacon and Rooka light-buoy, until outward bound shipping is clear of the dredged channel. Permission to enter New channel must first be obtained through the pilot vessel from the officer in charge of the Channel Control Station. No vessel may overtake or pass another vessel proceeding in the same direction in any of the dredged channels, nor in the river between North house (page 266) and Mu ʻĀvīyeh spit light-beacon (page 268) or in the dredged channel seaward of the beam bearing of Kasba rear leading beacon.

An inward bound vessel may not enter New channel later than four hours before high water; when so excluded she must wait until outward bound vessels are clear.

A vessel having received permission to enter and being unable to do so at the specified time shall inform the pilot vessel, and apply again for permission to enter when she is ready, in order that dredging and outward traffic may not be delayed.

All vessels navigating between the pilot-vessel and Kasba shall keep in constant radio touch with the Channel Control station.

When the dredger is working in New channel, a vessel entering from seaward must make the signal prescribed on page 258, and be guided by the reply.

Vessels employed in surveying display a red cone, and all vessels under way should endeavour to keep clear of them.

Vessels employed in lifting weights or moorings or from which a diver is working display a blue square flag, and passing vessels should reduce speed to the lowest compatible with safety and give such vessels as wide a berth as possible.

This rule also applies to small craft engaged in dredging, grabbing or pile driving operations.

Between sunrise and sunset all vessels, when at anchor in or near a fairway, shall display forward, where it can best be seen, one black ball, 2 feet ($0^{m}6$) in diameter.

No vessels within the harbours of Abādān (*Lat. 30° 20′ N., Long. 48° 17′ E.*) and Basra, other than small steam boats, should proceed against the stream at a greater speed than 5 knots over the ground.

Charts 1265, 2847, 2858, 748b.

Charts 3842, 3843, 3844, 1235.

An inward bound vessel shall not pass an outward bound vessel near No. 12 light-buoy (page 264), but must reduce speed and navigate with caution until the other vessel is finally past and clear. All alterations of course must be clearly indicated on the siren or whistle.

Vessels are not allowed to enter the dredged channel on a falling tide unless special permission to do so is obtained from the Channel Control station.

A vessel should not on any account attempt to enter New channel if by doing so she will meet or pass another vessel.

Vessels should regulate their speed so as not to approach a vessel ahead within a distance of one mile. This applies to vessels bound both outward and inward.

An inward bound vessel wishing to enter by the dredged channel should obtain permission to do so from the pilot vessel.

A vessel taking the ground between the outer light-buoys and the inner bar should at once display the International Code signal " A.T." by day, or at night exhibit two *red* lights, disposed vertically, as laid down in the Regulations for Preventing Collisions at Sea; in addition, should she block the channel, she should sound the letter " U " in Morse code (• • —) on her whistle or siren until answered by a tug or any following vessel repeating the signal. Should the vessel aground be in such a position that it is considered that there is room for a following vessel to pass, the signal " U " shall be followed by one short blast to indicate that she is aground on her starboard side of the channel and that following vessels may pass her on her port side, or by two short blasts to indicate that she is aground on her port side of the channel and that following vessels may pass her on her starboard side. These signals shall be repeated by the following vessel to indicate that she intends to attempt to pass.

A vessel requiring the assistance of the Channel Control station should display flag " T " of the International Code of Signals where it can best be seen.

Speed within the limits of the port is restricted to 10 knots over the ground. All vessels, when compatible with safety, are to proceed at slow speed when passing Fao, Bāwardā, Abādān and Al Khast, and also between any positions marked by " Slow " notice-boards.

Special regulations are in force for vessels carrying explosives within the Port of Basra.

Quarantine regulations.—On approaching the Shatt al 'Arab, vessels must contact Fao radio station 24 hours before arrival at the pilot station, and send the standard code quarantine message, as prescribed by the International Code of Signals, Vol. II, 1931, addressed to Port Health, Fao. The Health Declaration should be completed as usual and surrendered to the Quarantine official at the ship's destination.

Chart 3843.

Channel Control station. — Traffic and Tidal signals. — A Channel Control station, from which traffic signals are directed, is established at Fao (*Lat. 29° 58′ N., Long. 48° 29′ E.*). The Control station is equipped with radio, for details of which *see* the Admiralty List of Radio Signals, Vol. II. The traffic signals, and also the tidal signals, are displayed from masts situated on a large square building at Fao, as described below:—

Charts 1265, 2847, 2858, 748b.

Chart 3843.

Traffic Signals.—Two black balls disposed vertically, by day, and, at night, a *green* light over a *white* light, shown on the flagstaff at Fao, indicate that the channel is closed to all outward bound vessels.

Three black balls disposed vertically, by day, and, at night, two *green* lights, one at each yardarm of the flagstaff at Fao, indicate that the channel is closed to outward bound vessels of 28 feet ($8^{m}5$) draught and over.

A *green* light over a *red* light, at night, indicates that the channel is open to outward bound vessels.

A black cone, point up, or flag " N " of the International Code of Signals, indicates that no vessel is to pass the Channel Control station. At night, the station communicates by flashing lamp; the leading vessel is to acknowledge the signal, and repeat it to the next vessel astern until answered.

A black drum with a white horizontal band, by day, or, at night, two *green* lights, disposed vertically, 6 feet ($1^{m}8$) apart, shown from the flagstaff at Fao, indicate that an inward bound vessel has entered New channel; outward bound vessels must navigate with caution and must not pass the inward bound vessel eastward of No. 13 light-buoy (page 265).

Tidal Signals.—Signals indicating the rise of the tide on the bar above chart datum are shown by day and at night from the flagstaff at Fao (*Lat. 29° 58′ N., Long. 48° 29′ E.*).

By day the following signals are displayed:—

A cone, point up, indicates a rise of one foot ($0^{m}3$) or 7 feet ($2^{m}1$).
A cone, point down, indicates a rise of 2 feet ($0^{m}6$) or 8 feet ($2^{m}4$).
Two cones, points up, indicate a rise of 3 feet ($0^{m}9$) or 9 feet ($2^{m}7$).
Two cones, points down, indicate a rise of 4 feet ($1^{m}2$) or 10 feet ($3^{m}0$).
Two cones, point to point, indicate a rise of 5 feet ($1^{m}5$) or 11 feet ($3^{m}4$).
Two cones, base to base, indicate a rise of 6 feet ($1^{m}8$) or 12 feet ($3^{m}7$).

A square shape displayed from the opposite yardarm indicates an additional rise of 6 inches ($0^{m}2$).

When two cones are used they will be separated by a 2-foot ($0^{m}6$) tackline.

At night, the following signals are exhibited:—

One *green* light indicates a rise of 0 feet ($0^{m}0$) or 12 feet ($3^{m}7$).
One *white* light indicates a rise of 1 foot ($0^{m}3$) or 7 feet ($2^{m}1$).
One *red* light indicates a rise of 2 feet ($0^{m}6$) or 8 feet ($2^{m}4$).
Two *red* lights, disposed vertically, indicates a rise of 3 feet ($0^{m}9$) or 9 feet ($2^{m}7$).
One *red* light over one *white* light indicates a rise of 4 feet ($1^{m}2$) or 10 feet ($3^{m}0$).
One *white* light over one *red* light indicates a rise of 5 feet ($1^{m}5$) or 11 feet ($3^{m}4$).
Two *white* lights, disposed vertically, indicates a rise of 6 feet ($1^{m}8$).

One *green* light exhibited under any of the above signals, with the exception of that indicating 0 feet ($0^{m}0$) or 12 feet ($3^{m}7$), indicates an additional 6 inches ($0^{m}1$) above the exact foot.

When the channel is closed to all outward bound vessels, no tidal

Chart 3843.

signals will be shown at Fao (*Lat. 29° 58′ N.*, *Long. 48° 29′ E.*), but when the channel is closed only to vessels of 28 feet ($8^{m}5$) draught and over, they will be shown.

When a strong shamāl is blowing there is a considerable quantity of sand in the atmosphere, which sometimes makes it difficult to distinguish whether a *red* light is above or below a *white* light. Great caution should, therefore, be exercised when any signal is exhibited consisting of both *red* and *white* lights.

Charts 3842, 3843.

Dredgers.—Signals.—Regulations.—Whilst engaged in dredging operations, dredgers will show the following signals:—

By day.—

(*a*) Three black balls in the form of a triangle, one at the masthead and one at each yardarm.

(*b*) When necessary, a red flag will be displayed at the yardarm, instead of the black ball, on that side on which the channel is *not* available for navigation.

At night.—

(*a*) Three *white* lights in the form of a triangle, one at the masthead and one at each yardarm.

(*b*) When necessary, a *red* light at the yardarm, instead of the *white* light, on that side on which the channel is *not* available for navigation.

When a dredger is working in New channel, inward bound vessels on arriving at Rooka light-buoy (page 254), must sound a prolonged blast on their whistle or siren and must not enter the channel until the dredger replies with four prolonged blasts on her whistle or four long flashes on a lamp, which signals indicate that she is keeping clear of the channel or that, whilst remaining in the channel, vessels may pass her, in which case the signals described above will be exhibited.

These signals apply to all dredged channels, including Karun bar, and are to be used whenever a vessel wishes a dredger to leave the channel clear.

Chart 3842.

Channels.—Lights.—Beacons.—Maraqqat 'Abdullah and Maraqqat Abādān are two extensive banks, which dry in patches, and extend about 8 and 9 miles east-south-eastward from Ras al Bisha (*Lat. 29° 55′ N.*, *Long. 48° 34′ E.*) and the southern extremity of Jazīreh al Khidhr, respectively.

A light is exhibited, at an elevation of 55 feet ($16^{m}8$), from Outer Rooka beacon, consisting of a framework tower on piles, surmounted by a triangle, point down, situated about 4 miles east-north-eastward of Pile beacon.

A light is exhibited, at an elevation of 18 feet ($5^{m}5$), from Eastern Approach beacon, consisting of a black framework topmark on a pile structure, and a red lantern, situated about 3 miles north-westward of Outer Rooka light-beacon.

" Elf " beacon, a black pile structure 30 feet ($9^{m}1$) high, stands on Maraqqat 'Abdullah nearly 2¾ miles north-westward of Pile beacon; " Can " beacon, a similar structure, stands on Maraqqat Abādān about 3¼ miles northward of Pile beacon. The Shatt al 'Arab flows out between these banks, and is approached through two channels across the outer bar, namely, New channel, for deep draught vessels,

Charts 1235, 1265, 2847, 2858, 748b.

Chart 3842.

and Western channel, for shallow draught vessels, about 3 cables north-eastward of New channel.

New channel had been dredged, in 1954, to a depth of 21 feet (6^{m}4) and Western channel to a depth of 12 feet (3^{m}7). The depths in both channels are liable to change, and are maintained by dredging.

The Inner bar, east-north-eastward of Ras al Bisha, was, in 1943, dredged to a depth of 23½ feet (7^{m}2), whence the least depth to Fao was 21 feet in 1954.

New channel.—Lights.—Buoyage.—New channel is approached through Khōr al Amaya, a comparatively deep and narrow gut leading north-westward from Shatt al 'Arab light-vessel past Kafka light-buoy. In 1952, shoaling was reported on the western side of Khōr al Amaya about 6½ miles north-north-westward of the charted position of the Shatt al 'Arab light-vessel, where a depth of 26 feet (7^{m}9) was obtained.

The axis of the outer part of this channel is indicated by a pair of leading lights. The front light is exhibited, at an elevation of 18 feet (5^{m}5) from Middle New Channel beacon " C ", surmounted by a white triangle and situated about 2½ miles north-north-westward of Pile beacon; and the rear light, at an elevation of 55 feet (16^{m}8), from Middle New Channel beacon " D ", surmounted by a white triangle and situated about 8¾ cables north-westward of the front light-beacon. These lights in line bear 304°.

The axis of the inner part of the channel is indicated by two pairs of leading lights. The front light of the inner pair is exhibited, at an elevation of 18 feet (5^{m}5), from Inner New Channel Front beacon " E ", situated about 2¾ miles north-westward of " Elf " beacon; and the rear light, at an elevation of 55 feet (16^{m}8), from Inner New Channel Rear beacon " F ", situated about 8½ cables north-westward of the front light-beacon. These lights in line bear 301°. The front light of the outer pair is exhibited at an elevation of 18 feet (5^{m}5), from Outer New Channel Front beacon " B ", surmounted by a white triangle and situated about 2¼ miles east-north-eastward of Pile beacon; and the rear light, at an elevation of 55 feet (16^{m}8), from Outer New Channel Rear beacon " A ", surmounted by a black triangle and situated about 8½ cables south-eastward of the front light-beacon. These lights in line bear 121°.

A light is exhibited, at an elevation of 18 feet (5^{m}5), from Turning beacon, situated about 2 cables north-westward of the junction of the alignments of the outer and inner parts of the channel, and about 1¾ miles north-north-eastward of Pile beacon (*Lat. 29° 50′ N., Long. 48° 43′ E.*).

A can light-buoy, painted red and white in chequers, marked " Kafka ", and exhibiting a *white group flashing* light, showing *four* flashes, *every ten seconds*, is moored off the entrance to New channel about 8 cables south-eastward of Outer New Channel Rear beacon " A ".

A can light-buoy, painted red, marked " Outer Western " and exhibiting a *red group flashing* light, showing *two* flashes *every six seconds*, is moored between the alignments for New channel and Western channel (*see* below), about 4 cables south-eastward of Outer New Channel Rear beacon " A ".

The outer pair of leading light-beacons indicating the axis of the

Charts 1235, 1265, 2847, 2858, 748b.

Chart 3842.

channel through Inner Bar reach are situated on the south-western side of New channel; they are described on page 264.

Western channel.—Lights.—Buoyage.—Western channel is entered about 1½ cables northward of Outer New Channel Rear beacon " A ". Its axis is indicated by a pair of leading lights. The front light is exhibited, at an elevation of 18 feet (5^{m}5), from Western Channel Front beacon, surmounted by a white triangle and a white lantern, situated about 8 cables west-south-westward of " Can " beacon; and the rear light, at an elevation of 28 feet (8^{m}5), from Western Channel Rear beacon, surmounted by a black framework topmark and a red lantern, situated about 6 cables north-westward of the front light-beacon. These lights in line bear 306°.

Outer Western light-buoy is described on page 260.

A conical light-buoy, painted black and white in vertical stripes, marked " Inner Western ", and exhibiting a *white group flashing* light, showing *two* flashes, *every six seconds*, is moored near the inner end of Western channel, about 1½ miles south-eastward of Western Channel Front light-beacon (*Lat. 29° 53′ N., Long. 48° 43′ E.*).

Rooka channel.—Lights.—This channel is situated north-eastward of Western channel and is now disused.

Outer Rooka light-beacon and Eastern Approach light-beacon are described on page 259.

A light is exhibited, at an elevation of 18 feet (5^{m}5), from No. 4 beacon, a red pile structure situated on the southern side of the channel about 1¼ miles southward of Eastern Approach light-beacon.

A light is exhibited, at an elevation of 18 feet (5^{m}5), from No. 8 beacon, a black pile structure situated on the northern side of the channel about 1¼ miles west-north-westward of No. 4 light-beacon.

Charts 3842 to 3847, 1265.

DISTANCE TABLES

SHATT AL ‘ARAB

	nautical miles	
Palinurus shoal	—	—
Entrance of New channel	13	13
Inner end of New channel	5½	18½
Fao (*Lat. 29° 58′ N., Long. 48° 29′ E.*)	12	30½
Kasba point	2½	33
Chellabi point	8½	41½
Abādān	14½	56
Khorramshahr	11	67
Satan's Gap	4	71
Abu el Kassib	4	75
Sanger village	3½	78½
Basra (‘Ashār creek)	7	85½
Ma‘qil (No. 10 berth)	2½	88
Qarmat ‘Ali (Euphrates mouth)	2½	90½
Nahr ‘Umar	11½	102
Al Qurna	22	124

EUPHRATES RIVER

	nautical miles	
Al Qurna	—	—
Madīna	13	13
Kabāish	14	27
Hakika	22	49
Sūq ash Shuyūkh	6	55
An Nāsirīya	20	75
Samāwa	65	140

TIGRIS RIVER

Al Qurna	—	—
Al ‘Azair or Ezra's tomb	27	27
Aburuba	14	41
Qal‘a Sālih	12	53
Abū Sidra	15	68
‘Amāra	14	82

Charts 1235, 2847, 2858, 748b.

Charts 3842 to 3847, 1265.

DISTANCE TABLES

TIGRIS RIVER—*continued.*

	nautical miles	
Kumait . . .	27	109
'Alī Sharqī . .	14	123
Fulaifila . . .	20	143
'Alī Gharbī . .	16	159
Shaikh Sa'ad . .	30	189
Kūt al Imāra . .	40	229
Bghaila . . .	43	272
Al 'Azīzīya . .	53	325
El Kutineh . .	11	336
Baghdādīya . .	9	345
Lajj . . .	28	373
Bustān . . .	11	384
Ctesiphon . .	7	391

TIGRIS RIVER—*continued.*

	nautical miles	
Diahah river . .	12	403
Baghdād . .	18	421

KĀRŪN RIVER

Khorramshahr .	—	—
Mārid . . .	10	10
Ahwāz . . .	100	110
Wais . . .	24½	134½
Mullasani . .	7	141½
Band-e Qīr . .	4	145½
Saiyid Hassan. .	6½	152
Dar-e Khazīneh .	15	167
Shūshtar . .	24	191

Charts 3842, 1235.

Tidal streams.—Tides.—The turn of the tidal stream does not occur at low water, as the flood stream must attain sufficient strength to overcome the outflow of the river, which latter varies with the seasonal changes; consequently, the time of the change of the tidal stream also varies. During the dry season, when a big tide follows a small one, the intervening ebb is not sufficiently strong to cause an ebb tidal stream.

During the river flood season, when there are small tides, the flood tidal stream is not felt at all, especially up river, and even at a position about one mile above Middle New Channel Rear light-beacon " D " little or no flood stream is felt.

Charts 3842, 1235, 1265.

At Abādān, during the river flood season, the flood tidal stream will not make for a tide of less than 8 or 9 feet ($2^{m}4$ or $2^{m}7$) on the outer bar and, at the height of that season, the flood tidal stream will not make at all.

Under normal conditions the ebb tidal stream, at a position about one mile above Middle New Channel Rear light-beacon " D " (*Lat. 29° 53′ N., Long. 48° 41′ E.*), begins about 1½ hours after high water.

At Kasba the flood tidal stream commences about 1½ hours before high water on the outer bar, and the ebb stream from about 2½ to 3 hours after high water.

At Abādān the flood tidal stream commences at about the time of high water on the outer bar, but the time of commencement of the ebb stream varies greatly.

At Basra, during the river flood season, the ebb tidal stream attains a rate of 4 knots and, during the dry season, a rate of from one to 2 knots.

In the vicinity of Palinurus shoal the tidal stream on the rising tide attains a rate of from half a knot to 1½ knots, and that on the falling tide, from 1½ to 2½ knots.

In Khōr al Amaya, the tidal streams attain a rate of from one to 2 knots and continue to run for about 45 minutes at spring tides, and 25 minutes at neaps, after high and low water, respectively. The duration of slack water is about 20 minutes. The in-going tidal stream sets in a north-westerly direction.

In New channel, the streams set fairly through the channel, except at spring tides, when at either end there is a strong northerly set on the in-going stream, and a strong southerly set on the out-going stream; at neap tides these cross-currents are inappreciable. The maximum rate of the in-going stream, which at springs is from 1½ to 2 knots and at neaps from one to 1½ knots, occurs at about half-tide. The maximum rate of the out-going stream is from 3 to 3½ knots at springs, and from 2 to 2½ knots at neaps. At spring tides, the in-going stream continues to flow for about 40 minutes after the time of high water; at neaps it is irregular, but usually continues for about one hour after high water. The out-going stream continues for about 30 minutes after low water at springs, and for about one hour after low water at neaps.

H.M.S. *Triad*, in 1931, reported that the observed direction of the surface stream is not a reliable guide, for, when anchored about one mile west-north-westward of Middle New Channel Rear light-beacon " D," she swung to the in-going stream, about 2 hours after the time of low water, whilst an out-going stream with a rate of 2 knots continued to run past her. Caution is, therefore, necessary, as, if when turning into New channel, allowance is made for an observed out-going stream, it may be that the sub-surface in-going stream is already making, which might easily put a vessel on to the bank.

Tidal predictions for the Shatt al 'Arab outer bar, together with the differences for Basra (*Lat. 30° 30′ N., Long. 47° 50′ E.*) and other localities, are given in the Admiralty Tide and Tidal Streams Tables (Atlantic and Indian Ocean Volume).

Seasonal variations in the level of the river are small at the outer bar, less than ±0.5 feet ($0^{m}1$); but at Basra they are considerable, +2.5 feet ($0^{m}7$) in June, and —1.5 feet ($0^{m}4$) in October; these affect high and low water equally. In the river, the highest levels occur in May, June, and July, when the Shatt al 'Arab is discharging the combined flood-waters of the Euphrates and Tigris. The lowest levels occur in October and November. Further details of seasonal variations of level are given in the Admiralty Tide Tables.

The dry season commences in the autumn and continues until the spring when the snow inland begins to melt; during the winter, however, there are frequent freshets caused by local rains.

The chart datum is based on the dry season and varies in different reaches of the river.

Silting occurs in the river during the flood season and is augmented by the outflow of the Karūn river which, due to its rapid rise and fall caused by local heavy rains, brings down large quantities of silt which are deposited on the Karūn bar and later carried downstream by the main river into the dredged channels; it is estimated that 75 per cent of the silt is from the Karūn river and the remainder from the Tigris and Euphrates rivers; heavy silting is reported to occur about every five years.

Both the times and the heights of the tide are very much affected by the prevailing wind. A heavy kaus will raise the level of the river by 2 or 3 feet ($0^{m}6$ to $0^{m}9$), causing both a higher high water and a higher low water; it will also accelerate the time of high water; the effect is often felt before the arrival of the wind. On the other hand, a strong shamāl will lower the level of the river, the effect not being

Charts 3842, 1235, 1265.

felt immediately, so that at low water the tide may fall below the zero of the tide gauge, and it will retard the time of high water.

Charts 3842, 3843.

Inner bar reach. — Lights. — Tide-gauge. — Buoyage. — This reach extends about 5 miles, from a position about 9 cables west-north-westward of Middle New Channel Rear light-beacon " D " to a position about 1½ miles east-north-eastward of South Mast (page 253).

The centre line of the dredged channel through the reach is indicated by the alignment of two light-beacons situated north-westward of its inner end, on the northern side of the river, and by two light-beacons south-eastward of its outer end.

The front light of the inner pair is exhibited, at an elevation of 19 feet (5^{m}8), from a white circular column surmounted by a triangle, on a pile structure, situated on the coastal bank about 1¼ miles north-eastward of South Mast (*Lat. 29° 56' N., Long. 48° 34' E.*), and the rear light, at an elevation of 50 feet (15^{m}2), from a white framework tower, surmounted by a black daymark, on a pile structure, situated about 3½ cables north-westward of the front light-structure. These lights in line bear 304°.

The front light of the outer pair is exhibited, at an elevation of 18 feet (5^{m}5), from a white circular column, surmounted by a triangle, on a pile structure, situated about 1½ miles east-north-eastward of " Elf " beacon; and the rear light, at an elevation of 54 feet (16^{m}5), from a black steel framework structure, surmounted by a white triangle, on a pile structure, situated about 8 cables south-eastward of the front light-structure. These lights in line bear 124°.

A tide-gauge, from which a light is exhibited, stands on the north-eastern side of the channel about 5 cables northward of Inner New Channel Front light-beacon " E."

A light is exhibited, at an elevation of 18 feet (5^{m}5), from Inner Rooka beacon, situated on the north-eastern edge of Maraqqat Abdullah, about one mile southward of the tide gauge.

No. 10 can light-buoy, painted red and exhibiting a *red flashing* light, *every six seconds*, is moored on the south-western side of the channel about 1½ miles east-south-eastward of Inner Rooka light beacon.

No. 11 conical light-buoy, painted black and exhibiting a *white flashing* light, *every six seconds*, is moored on the north-eastern side of the channel about one mile west-north-westward of the tide-gauge.

No. 12 conical light-buoy, painted red and white in vertical stripes and exhibiting a *white group flashing* light, showing *two* flashes, *every twelve seconds*, is moored at the junction of Inner bar reach and Fao reach about 5½ cables south-eastward of the front light-beacon of the inner pair of Inner bar reach leading lights.

Chart 3843.

Fao reach.—Lights.—Buoyage.—Tide-gauge.—Beacons.—This reach extends from the Inner bar to Fao (*Lat. 29° 58' N., Long. 48° 29' E.*), a distance of about 6 miles.

The axis of the dredged channel is indicated by four pairs of leading lights.

The front light of the outer pair is exhibited, at an elevation of

Charts 2847, 2858, 748b.

15 feet ($4^{m}6$), from Outer Fao Reach Front beacon, situated about 2 miles east-north-eastward of South Mast; and the rear light, at an elevation of 41 feet ($12^{m}5$), from Outer Fao Reach Rear beacon, situated about 6 cables east-south-eastward of the front light-beacon. These lights in line bear 107½°.

Fao reach leading lights are exhibited, the front light, at an elevation of 30 feet ($9^{m}1$), from a white framework structure situated on the south-western bank of the river about half a mile below Fao; and the rear light, at an elevation of 75 feet ($22^{m}9$), from a black framework tower, surmounted by a triangle, situated about 8½ cables west-north-westward of the front light-structure. These lights in line bear 289°.

The inner part of Fao reach is marked by two pairs of leading lights. The front light of the inner pair is exhibited, at an elevation of 16 feet ($4^{m}9$), from a circular column, surmounted by a triangle, on a pile structure, situated on the south-western bank of the river about 1¾ miles above Fao; and the rear light, at an elevation of 54 feet ($16^{m}5$), from a black framework tower, the lower part of which is painted white, surmounted by a black triangle, situated about 3½ cables west-north-westward of the front light-beacon. These lights in line bear 303°. The front light of the outer pair is exhibited, at an elevation of 12 feet ($3^{m}7$), from a white, steel structure with a white triangle half-way up, situated on the south-western bank of the river about 2½ miles below Fao (*Lat. 29° 58′ N., Long. 48° 29′ E.*); and the rear light, at an elevation of 63 feet ($19^{m}2$), from a white framework tower with a black daymark, situated about 5 cables east-south-eastward of the front light-structure. These lights in line bear 123°.

No. 14 can light-buoy, painted red and exhibiting a *red flashing* light is moored on the southern side of the channel about one mile westward of the front light-beacon of the inner pair of light-beacons for Inner Bar reach.

No. 13 conical light-buoy, painted black and exhibiting a *white quick flashing* light, is moored on the northern side of the channel about 1¼ miles west-north-westward of No. 14 light-buoy.

A conical light-buoy, painted black and exhibiting a *white flashing* light *every two seconds*, is moored on the north-eastern side of the channel about half a mile northward of Fao.

A conical light-buoy, painted black and exhibiting a *white flashing* light *every four seconds*, is moored on the north-eastern side of the channel about 1¾ miles above Fao.

A conspicuous dark tree stands on the northern bank of the river about 1¼ miles north-eastward of the rear light-beacon of the outer pair of light-beacons for the inner part of Fao reach.

A tide-gauge stands on the southern bank opposite the dark tree; this depth is indicated by white figures on a black background.

A beacon stands on the south-western bank of the river about 1½ miles below Fao.

Floating pipe-line. — Dolphins. — Light. — Mooring buoys. — Three dolphins in a line are situated off the southern bank of the river, about 7 cables west-north-westward of the above tide-gauge. A floating pipe-line extends to the shore from the centre dolphin; a light is exhibited from this dolphin. A mooring buoy lies at each

Chart 3843.

end of the line of dolphins. Vessels must not attempt to pass between the dolphins and the river bank.

Fao.—Radio station.—Fao is situated on the south-western bank of the river about 5¼ miles west-north-westward of South Mast near Ras al Bisha. It is the repair and stores depôt for the dredgers, and the buoyage depôt for the port of Basra and the Persian Gulf lights.

The upper limit of Fao harbour is an imaginary line drawn across the river about 1,000 feet ($304^{m}8$) above "D" anchorage transit beacons in Kasba reach (*see* below).

There is a wooden jetty, with a depth of 3 feet ($0^{m}9$) at its head.

Several white mooring buoys are situated off the northern bank abreast the town.

Black notice-boards with the word "Slow" in white letters, are situated on the south-western bank of the river about 3½ miles above and half a mile below Fao; between them vessels must proceed at slow speed.

Traffic and tidal signals (*see* page 257) are shown from masts erected on the top of a large square building, 35 feet ($10^{m}7$) in height, situated in the northern part of Fao.

There are a radio station (*see* page 18) and a hospital at Fao (*Lat. 29° 58′ N., Long. 48° 29′ E.*).

A steel framework radio mast, 150 feet ($45^{m}7$) in height, is situated at the oil terminal about 1¼ miles west-north-westward of Fao.

Four **T**-headed loading jetties, Nos. 1, 2, 3 and 4, with depths of 33 feet ($10^{m}1$) alongside, extend from the south-western bank of the river abreast the oil terminal.

Prohibited anchorage.—Anchorage is prohibited in an area between imaginary lines drawn across the river from Fao flagstaff and the front leading light-structure nearly 2¼ miles north-westward.

Kasba reach.—Lights.—Beacons.—Light-buoy.—Anchorage.—This reach extends from a bend in the river at Kasba point on the eastern bank and about 2 miles above Fao, to North House, a square mud house, without dome or minarets, used as a police post, situated on the eastern bank of the river about 3¼ miles above Kasba point. On the same bank and about 1¼ miles southward of North House, is a conspicuous square fort. In this reach the channel skirts the eastern bank of the river.

The centre line of the channel is indicated by the alignment of two leading lights. The front light is exhibited, at an elevation of 29 feet ($8^{m}8$), from a white, steel, framework structure, surmounted by a diamond, situated on the south-western side of the river about three-quarters of a mile south-westward of Kasba point; and the rear light, at an elevation of 54 feet ($16^{m}5$), from a black framework tower, the lower part of which is painted white, surmounted by a black triangle, situated about 1½ cables southward of the front light structure. These lights in line astern, bearing 178°, lead through the fairway as far as the square fort. The rear light of the inner pair of leading lights for Fao reach is exhibited from the rear light structure of this pair.

About 8 cables above the front light structure in Kasba reach, and on the same side of the river, is the first pair of four sets of anchoring beacons for vessels of deep draught waiting to cross the bar. The beacons, from each front beacon of which a light is exhibited, consist in each case of iron structures; the front beacons carry a triangular

Charts 1235, 1265, 2847, 2858, 748b.

Chart 3843.

daymark, at an elevation of 20 feet ($6^{m}1$), and the rear beacons a St. George's cross at an elevation of 32 feet ($9^{m}8$). These pairs of beacons are lettered consecutively from seaward " A ", " B ", " C ", and " D ", the letters being in white on a black background at the base of the beacons. The berths indicated by the beacons are about 1,350 feet ($411^{m}5$) apart.

Kasba beacon is a black and white surveying beacon, 50 feet ($15^{m}2$) high, situated between " B " and " C " rear anchorage beacons.

North House beacon (*Lat. 30° 04′ N., Long. 48° 27′ E.*) consists of a steel mast painted black and white in horizontal bands, 45 feet ($13^{m}7$) high, standing close westward of North House.

A can light-buoy, painted red, exhibiting a *red flashing* light *every five seconds*, is moored on the western side of the fairway, about 1¾ cables westward of North House beacon.

A large and conspicuous house stands on the south-western bank of the river about 2¾ cables west-north-westward of the front leading light structure.

A vessel proceeding up river, after passing the square fort in Kasba reach, should steer to pass midway between North House beacon and the light-buoy. A vessel of deep draught should avoid arriving off North House at low water, as the depth in the channel there is not more than 25½ feet ($7^{m}8$).

North House to Kabda point.—Light.—Buoyage.—Beacons.—Tide-gauge.—About 1¼ miles above North House, the channel closes the western bank.

Chellabi can light-buoy, painted red and exhibiting a *red flashing* light *every three seconds*, is moored about 8 cables north-westward of North House beacon.

Dora conical light-buoy, painted red and white in vertical stripes, and exhibiting a *group flashing light*, showing *two* flashes *every ten seconds*, is moored about 2 miles north-westward of North House beacon. Vessels of deep draught should pass north-eastward of this light-buoy.

An illuminated tide-gauge is situated on the south-western bank, about 2¾ miles above North House.

Two notice-boards, carrying the letters " E " and " F ", are situated one cable and 1¾ cables, respectively, below and above the tide-gauge to indicate anchorage berths for vessels of deep draught awaiting the tide to cross the bar at North House.

A conspicuous dark tree stands on the western bank of the river about 8 cables west-north-westward of North House beacon.

A large and conspicuous house stands on the south-western bank, about 1¾ miles north-westward of the tide-gauge. In 1947, this house was reported to be obscured by trees.

Brick Kiln light is exhibited, at an elevation of 45 feet ($13^{m}7$), from a steel mast painted black and white in horizontal bands, situated on the western bank of the river about 2¾ miles above the tide-gauge.

A conical light-buoy, painted black and exhibiting a *white flashing* light, *every three seconds,* is moored on the eastern side of the fairway about half a mile north-eastward of Brick Kiln light-structure (*Lat. 30° 08′ N., Long. 48° 23′ E.*).

After passing Chellabi point, situated on the eastern bank about 5 miles above North House, the channel closes the eastern bank.

Charts 1235, 1265, 2847, 2858, 748b.

Chart 3843.

About 1½ miles above this point, and on the same side of the river is Khaz‘alābād, a village with numerous mud and sandstone buildings, a stone pier, a flagstaff, and a Persian Customs station.

An ‘Iraqi Customs and Police station, where there is a flagstaff, is situated on the western bank about 9 cables above Brick Kiln light-structure.

Two black notice-boards, with " Slow " in white letters on them, stand on the western bank of the river, about 16½ cables and 3¼ miles north-north-eastward, respectively, of Brick Kiln light-structure; the river area between these notice-boards is known as Kabda harbour. The northern board is situated on Kabda point.

An oil terminal, off which project three small piers, stands on the east bank about one mile above Khaz ‘alābād.

Chart 3844.

Kabda reach.—Lights.—Buoyage.—This reach lies between Kabda point and Al Khast point, about 12 miles north-westward. For the first 9 miles the channel follows the south-western bank of the river, the opposite bank being bordered by a chain of islands and flats of which Mu‘āvīyeh and Dawāsir are the largest islands.

Mu‘āvīyeh conical light-buoy, painted red and white in vertical stripes, surmounted by a daymark similarly painted, and exhibiting a *red flashing* light *every five seconds*, is moored about 1½ cables south-westward of the extremity of Mu‘āvīyeh spit, that extends about 4 cables south-south-eastward from that island. Vessels of deep draught should pass eastward of this light-buoy, but vessels of light draught may pass westward of it.

The fairway of the channel abreast and above Dawāsir is indicated by the alignment of two light beacons. The front light (*Lat. 30° 13′ N., Long. 48° 23′ E.*) is exhibited, at an elevation of 25 feet (7^{m}6), from an iron pillar painted black and white in horizontal bands, situated on the south-western bank of the river, about 5½ cables southward of the north-western extremity of Mu‘āvīyeh; and the rear light, at an elevation of 80 feet (24^{m}4), from an iron pillar painted black and white in horizontal bands, surmounted by a black triangle, situated about 4 cables south-eastward of the front light-beacon.

These light beacons in line astern bear 141°.

A conical light-buoy, painted black and exhibiting a *white flashing* light, *every six seconds*, is moored about 2 miles north-westward of the front leading light structure. Vessels of deep draught should pass south-westward of this light-buoy.

The village of Mu‘āvīyeh is situated on the north-eastern bank of the river abreast the north-western part of Mu‘āvīyeh.

Two Iranian Police and Customs stations are situated on Dawāsir, and an ‘Iraqi Police and Customs station is situated on the south-western bank opposite.

Abādān reach.—Lights.—Caution.—Anchorage.—Radio Station.—Abādān is situated on the north-eastern bank just below and opposite Al Khast. There are many large buildings at the refineries of the Oil Company, the tall chimneys of which are good marks.

The whole of Abādān reach is a danger zone, and special regulations are in force therein. (*See* page 255).

At Abādān and Bāwardā, about one mile south-eastward, there are 27 berths, alongside some of which ocean-going vessels may be berthed.

Charts 1235, 1265, 2847, 2858, 748b.

Chart 3844.

Lights are exhibited from Nos. 3 and 7 jetties. No. 7 jetty, which is 1,400 feet (426^{m}7) long, has a least depth of 57 feet (17^{m}4) alongside and is the main cargo quay. In 1949, Abādān and Khorramshahr (page 271) had a population of 201,000.

Anchorage is prohibited in Abādān reach within the limits of the harbour indicated by the " Slow " notice-boards. These slow notice-boards are situated on both sides of the river just below Bāwardā, and also on both banks northward of Al Khast, that on the right bank being a short distance below Seeba, a village, at which there is a Police and Customs station (*Lat. 30° 20′ N., Long. 48° 16′ E.*).

There are a number of mooring buoys on the south-western side of the river between Abādān and Bāwardā. A Harbour Master boards vessels on arrival and berths them as necessary. All sea-going vessels, whether awaiting a berth or loaded must be moored below the lowest jetty, at Bāwardā, and no vessel bound for Abādān or Bāwardā may ascend the river above that point until boarded by the Harbour Master.

There are six anchoring berths, lettered " A " to " F ", below the line joining the two notice-boards, which mark the southern harbour limit; the limit of each berth is marked by transit beacons on the right bank of the river.

The offices of the port are on board a hulk moored off Bāwardā.

The framework mast of a coastal radio station, maintained by the Oil company, is situated about 6¾ cables north-north-eastward of No. 1 jetty.

Vessels in Abādān reach should on no account sound their sirens, except in a case of emergency, as the " fire alarm " at Abādān and Bāwardā is given by siren.

Tidal streams.—At Abādān, the in-going tidal stream attains a rate of 1½ knots, and the out-going stream 3 knots. Heavy flooding of the Tigris and Euphrates rivers, which is frequent during the late spring may increase the rate of the out-going stream to 5 knots, and the in-going stream may be entirely overcome.

Port facilities.—Fresh provisions are not usually obtainable at Abādān, though fresh meat, but of poor quality, can be obtained at a few days notice. Water can be obtained alongside the jetties and supplies are ample. Fuel oil is supplied alongside the jetties or by lighter at the anchorage.

There are seven 3-ton travelling cranes at No. 7 jetty, and one 3-ton derrick at No. 8 jetty.

No. 1 floating dock, with a lifting capacity of about 800 tons, from each end of which lights are exhibited, is moored off the south-western bank of the river, south-westward of No. 8 jetty.

No. 2 floating dock, from each corner of which lights are exhibited, is moored about one cable off the south-western side of the river south-westward of No. 5 jetty; for details *see* Appendix I. A blue square flag will be displayed when this dock is being raised or lowered; mariners are warned to reduce speed when passing the dock.

Major repairs to hulls, machinery and electrical equipment can be undertaken and, in addition to the two floating docks referred to above, there are two slipways for small craft.

There are a number of powerful tugs, several of which are equipped with salvage appliances.

Charts 1235, 1265, 2847, 2858, 748b.

Chart 3845.

Al Khast reach.—Submarine pipe-lines and cables.—Prohibited anchorages.—Light-buoy.—Tidal signals.—Tide-gauge. —Al Khast reach extends from Al Khast point for about 7½ miles to about half a mile above Hārtheh point. Northward of Al Khast (*Lat. 30° 20′ N., Long. 48° 16′ E.*), the deep channel is on the northern side of the river, and then crosses to the southern side, south-eastward and southward of Hāji Salbuq, then it skirts the western side of that island, passing eastward of the islands of Gat'a and Abu Dood, and the banks extending northward from the latter.

Anchorage is prohibited, due to the existence of submarine cables and a pipe-line, in an area, indicated by pecked lines on the chart, extending across the river at the eastern end of Al Khast reach between an imaginary line drawn 180° across the river about 1½ cables eastward of the " Slow " notice boards at the western end of Abādān reach, referred to above, and an imaginary line drawn 180° from a " Prohibited anchorage " notice board on the northern bank about 1½ miles westward; a submarine pipe-line, indicated by a pecked line on the chart, extends south-eastward across the river from the latter notice board. Two mooring buoys are laid on the north-western side of the river about half a mile south-westward of the " Prohibited anchorage " notice board on the south-eastern side of Hāji Salbuq.

A light-buoy, painted red and exhibiting a *red flashing* light, *every three seconds,* is moored on the western side of the channel about 2½ cables south-westward of Hārtheh point, a point on the eastern bank, about 5½ cables north-north-westward of the north-western extremity of Hāji Salbuq; it marks the eastern edge of the spit extending northward from Abu Dood.

An automatic night tidal signal, mounted on a four-pile structure at an elevation of 20 feet (6^{m}1), is situated on the eastern side of Gat'a about 4 cables from its southern extremity.

There is a tide-gauge on the western side of the channel eastward of the south-eastern extremity of Abu Dood.

The channel north-eastward and northward of Hāji Salbuq is only available to boats.

With a strong out-going tidal stream, an eddy, which must be guarded against, is formed in the southernmost part of the curve in Al Khast reach, southward of Hāji Salbuq.

Kārūn bar.—Prohibited anchorage.—Lights.—Buoyage.—This bar extends from about half a mile above Hārtheh point to just below the junction of Hafar channel with the main channel, about 2½ miles farther northward.

The track across the bar varies considerably, especially at the beginning of the flood season, March or April, when very rapid alterations in the channel may be expected. As these alterations prevent the establishment of permanent leading marks, light-buoys, which are moved as necessary, are employed to mark the channel.

Anchorage is prohibited in the vicinity of a submarine pipe-line which crosses the river close southward of No. 3 surveying mark, about 1¾ miles northward of Abu Dood island; the shore ends of the pipe-line are each marked by a notice-board.

A conical life-buoy, exhibiting a *white flashing* light, is moored on the western side of the channel about one mile above Hārtheh point.

A conical light-buoy, painted red and exhibiting a *red flashing* light

Charts 1235, 1265, 2847, 2858, 748b.

Chart 3845.

is moored on the western side of the channel about 1½ miles above Hārtheh point.

Two lights are exhibited near the south-eastern extremity of Um al Rasas, the south-eastern part of the island of Um al Khasasif or Dabbah, about 2½ miles above Hārtheh point.

At all times when the bar is in an unsettled condition a surveying vessel is stationed there to check the depths, and when necessary a special pilot boards inward bound vessels in the vicinity of Hārtheh point to conduct them across the bar.

Numerous surveying marks are maintained on either bank of the river. Dabbah spit conical light-buoy, painted black, exhibiting a *red flashing* light *every two seconds*, marks the extremity of the spit, on the western side of the bar, extending south-eastward from Um al Rasas (*Lat. 30° 25′ N., Long. 48° 10′ E.*), the south-eastern end of Um al Khasasif, in a position about one mile below the mouth of Hafar channel.

Four mooring buoys lie off the eastern bank of the river just below the entrance to Hafar channel.

Except in the flood season the least depth over the Kārūn bar is usually about 19 feet (5^{m}8), though in 1939 it was 15 feet (4^{m}6), in mid-channel about 9 cables south-eastward of the southern light structure near the south-eastern extremity of Um al Rasas island; a depth of 13 feet (4^{m}0) was also reported on the western side of the fairway about 16 cables south-south-eastward of the same light structure, and about 2½ cables off the western bank of the river.

Hafar channel.—Khorramshahr.—Beacons.—Hafar channel, usually known as the Kārūn, connects Shatt al 'Arab with that river, and, in 1953, had depths of from 11 to 18 feet (3^{m}4 to 5^{m}5); the largest vessel known to have entered the port had a draught of 17 feet (5^{m}2). There is a statue of H.I.M. Riza Khan, the late Shah of Persia, and a flagstaff close north-eastward of it, on the southern side of the entrance to the channel, also two jetties and the quarantine station.

There is a wharf on the northern side of the entrance besides the Custom house and British Consulate. The wharf and the wall adjacent to it, are practically dry alongside at low water.

There are six wooden and one steel **T**-jetties, with depths of from 7 to 16 feet (2^{m}1 to 4^{m}9) alongside, on the southern bank opposite to Khorramshahr; there is a hand-worked travelling crane, with a capacity of 5 tons, on one of the wooden jetties. There are some mooring buoys in the river.

About 3½ cables eastward of No. 5 jetty, and on the southern bank, are four sets of anchoring beacons lettered A to D in white; the front beacons each consist of a railway iron surmounted by a triangle at an elevation of 15 feet (4^{m}6); the rear beacons are similar but surmounted by a St. Andrew's cross at an elevation of 23 feet (7^{m}0); the anchoring berths indicated by the alignment of these beacons are 1,000 feet (304^{m}8) long, 200 feet (61^{m}0) apart and marked by transit beacons at both ends.

Khorramshahr (*Lat. 30° 26′ N., Long. 48° 11′ E.*), the principal port in Persia, stands on the northern side, and about half a mile within the entrance to Hafar channel, and in 1954, the population of Abādān and Khorramshahr was estimated to be about 201,000; it is the seat

Charts 1235, 1265, 2847, 2858, 748b.

Chart 3845.

of Government of the Governor of Khorramshahr. The town is reported to be comparatively cool and healthy.

The water in Hafar channel is purer and cooler than that of the Shatt al 'Arab; in summer a difference in temperature of 16° has been observed.

Boats can go alongside the landing jetty southward of the Oil Company's premises at Khorramshahr at any state of the tide and lighters can lie alongside the Custom house wharf.

Vessels whose draught permits them to do so may lie off the town close to the bank, but there is no room to swing, and ocean-going vessels usually anchor in the Shatt al 'Arab north-westward of the entrance of Hafar channel, cargo being worked by means of lighters. There is an illuminated tide-gauge on the north-eastern side of Um al Rasas island, westward of the entrance of Hafar channel.

The speed of vessels should not exceed 6 knots while passing Khorramshahr.

Prohibited anchorage.—Anchorage in the entrance to and within Hafar channel, in areas indicated by pecked lines on the chart, is prohibited, owing to the existence of telegraph cables.

Trade.—The principal exports are heavy oil, petrol, carpets, opium, gum, fruits, hides and skins, animal casings, cotton, wooden staves and rice. The chief imports are cotton and woollen fabrics, tea, sugar, motor vehicles, railway materials, industrial machinery, chemicals and drugs, electrical goods, hardware, chinaware and cement.

Port facilities.—Meat is fairly plentiful, but no bread is available. Water is laid on to five of the jetties on the southern bank, but no water is available for vessels from the wharves on the northern bank.

Khorramshahr is connected to the general telegraph system.

Charts 3845, 3846.

Khorramshahr to Basra.—Wharves.—Shoal.—Buoyage.—On the southern side of the main channel between the entrance to Hafar channel and Basra, a distance of about 19 miles, are the islands of Um al Khasasif, Um al Labani, Rumailah and Buljaniyah, and on the northern side are the islands of Ash Shamshamīya, At Tuwaila, and 'Ajairawīya.

The channel follows the northern bank of the river to the western end of Um al Khasasif, where it passes through Satan's Gap (*Lat. 30° 27′ N., Long. 48° 06′ E.*), between Um al Khasasif and Ash Shamshamīya. It then skirts the southern sides of Ash Shamshamīya and At Tuwaila until about 2 miles above the western end of Buljaniyah, whence it follows the southern bank of the river.

Chart 3845.

Santab wharf, which is 3,280 feet ($999^{m}7$) in length, with six berths for ocean-going vessels, lies on the north-eastern side of the channel with its southern end about half a mile north-westward of the northern entrance point of Hafar channel. The wharf is equipped with three 12-ton mobile cranes for discharging from lighters to rail trucks.

Early in 1949, it was reported that silting had occurred alongside Santab wharf, and the depths there at that time varied from 15 to 22 feet ($4^{m}6$ to $6^{m}7$).

On the eastern bank of Failiya creek, on the same side of the river as Santab wharf but nearly 4 cables upstream, there is a large wharf for lighters which, however, is not accessible at low water. The wharf

Charts 1235, 1265, 2847, 2858, 748b.

Chart 3845.

is equipped with one 100-ton derrick and three mobile heavy cranes but, in 1949, these were reported to be out of use.

A conspicuous tall single palm tree stands about half a mile north-westward of Santab wharf.

The palace of the Shaikh of Mohammera is situated on the northern bank of the river about 3 miles above the entrance of Hafar channel, and about a quarter of a mile farther upstream is the mouth of Khaiyin canal. White pillars marking the boundary between 'Iraqi and Persian territory are situated on either side of the mouth of Khaiyin canal, whence the boundary trends northward so that above the canal both banks of the Shatt al 'Arab are in 'Iraqi territory.

An automatic night tidal signal mounted on a four-pile structure, at an elevation of 20 feet ($6^{m}1$), is situated about 2 cables westward of the western boundary pillar.

Satan's Gap is a narrow pass; the channel through it is marked on its northern side by a conical light-buoy, painted green and exhibiting a *green flashing* light, and on the southern side of the channel by a green can buoy.

The remains of a sunken wreck, over which there is a depth of 28¼ feet ($8^{m}6$), lies near the middle of Satan's Gap, and causes a large deflection of the compass when a vessel is passing over it; when passing through Satan's Gap the vessel should, therefore, be steered by the land or conned until such time as the compass becomes steady

Should vessels bound in opposite directions sight each other when approaching Satan's Gap, the vessel stemming the current should reduce speed or stop until the other vessel has passed clear.

Two easily identified dark trees stand on the northern side of Buljaniyah, south-westward of Satan's Gap (*Lat. 30° 27′ N., Long. 48° 06′ E.*)

Chart 3846.

A 23-foot ($7^{m}0$) patch is situated about 1½ cables north-north-westward of the western extremity of the island of Buljaniyah, and is marked close on its western side by a can light-buoy, painted red, exhibiting a *red flashing* light *every six seconds.*

Several white mooring buoys for the use of ocean-going steamers, are situated off Sanger village, on the northern side of the channel about 5 miles above the western extremity of Buljaniyah.

Basra.—Lights.—The port of 'Iraq is Basra, situated on the south-western side of the Shatt al 'Arab in Basra reach, which latter trends north-north-westward from the north-western end of 'Ajairawīya island.

Basra city is a walled town about 1½ miles up 'Ashār creek, which is entered about one mile above the north-western extremity of 'Ajairawīya island. Outside the walls of the city are extensive suburbs, separated by gardens and date groves, which border both sides of the creek to its mouth; the creek is spanned by several bridges. In 1954, the population of Basra was estimated at 125,000.

The town of 'Ashār is situated on the river front on both sides of the mouth of 'Ashār creek. The Custom house stands on the northern side of the mouth of the creek, and the British Consulate on the southern side.

Red obstruction lights are exhibited from three radio masts, 98 feet

Chart 3846.

(29^{m}9) high, situated about 1¾ miles west-north-westward of the mouth of ʻAshār creek.

Trade.—Shipping.—The principal exports are crude petroleum, dates, grain, wool, hides and skins, cotton, and live animals; the chief imports are cotton piece goods, sugar, tea, machinery, electrical machinery and motor vehicles.

During the year 1952, 653 vessels of an aggregate gross registered tonnage of 2,059,000 tons entered Basra.

Health.—The climate of Basra is considerably drier and more healthy than that of the Persian gulf, and the heat is less oppressive.

Consul.—British Consular officers are stationed at Basra (*Lat. 30° 30′ N., Long. 47° 50′ E.*).

Regulations.—Quarantine. Special regulations and quarantine regulations are in force in the port of Basra and Khasrowabad harbour, *see* page 255. Masters of vessels should obtain a copy of the bye-laws on arrival.

Every vessel arriving at the port of Basra, except H.M. ships, shall be considered as in quarantine until the Port Health Officer has boarded her and granted pratique; and no person is to be allowed to board or leave the vessel, except the pilot and the Harbour Master, until such time as pratique has been granted. Mail steamers and oil tankers are inspected on arrival; other vessels between sunrise and sunset only. Infected or suspected vessels must anchor below Khora creek, opposite the north-western end of ʻAjairawīya island, for medical inspection.

There is a civil hospital at Basra, also an isolation hospital.

For deratisation, *see* page 17.

Prohibited anchorage.—Anchorage is prohibited, on account of the existence of submarine cables in an area about one mile above the mouth of ʻAshār creek, the limits of which are indicated by pecked lines on the chart. Each end of both limits is marked by a notice-board.

Maʻqil.—Lights.—Maʻqil, the shipping centre of Basra, is situated about 3 miles above the entrance to ʻAshār creek and on the same side of the river. The Port Directorate headquarters are situated in rear of No. 5 wharf.

The port signal station is at the south-eastern end of Maʻqil, about 2½ miles above the entrance to ʻAshār creek (*Lat. 30° 31′ N., Long. 47° 51′ E.*).

Red obstruction lights are exhibited from a water tower, 60 feet (18^{m}3) high, situated about 3¾ cables west-south-westward of the Port Directorate headquarters.

Wharves.—Mooring buoys.—Anchorage.—Directions.—There are twelve deep water wharves and a lighter wharf at Maʻqil; the lighter wharf is the farthest upstream; the remainder are numbered consecutively from upstream downwards, and are connected with the railway system.

Wharves Nos. 1 to 9 have a continuous frontage of 4,600 feet (1,402^{m}1) and depths of between 24 and 28 feet (7^{m}3 and 8^{m}5) alongside. They are served by 22 electric travelling cranes of from 2 to 8 tons capacity; of these, one 8-ton crane serves wharves Nos. 4 and 5, and another 8-ton crane serves wharves Nos. 6 and 7.

Wharves Nos. 10 to 12, situated in the vicinity of Jubailah creek,

Charts 1235, 1265, 2847, 2858, 748b.

Chart 3846.

have depths of from 16 to 21 feet ($4^{m}9$ to $6^{m}4$) alongside; No. 11 wharf, which is 650 feet ($198^{m}1$) in length and has a depth of 18 feet ($5^{m}5$) alongside, is equipped with a 70-ton fixed luffing crane.

There are also four temporary berths for ocean-going vessels, and special wharves are reserved for the handling of petrol, fuel oil, and kerosine.

There are several mooring buoys in this reach of the river.

Large vessels can lie with safety in the stream or alongside. Most of the berths alongside are designed to take vessels of up to 26 feet ($7^{m}9$) draught. If possible, vessels should berth on the ebb with bows upstream as the flood is frequently weak or absent altogether, in which case casting off with bows downstream may be difficult.

A vessel arriving at Basra bound for the wharves will be boarded by a Harbour Master off Jubailah creek, about 2 miles above the entrance to 'Ashār creek; those bound for a buoy or mooring in the stream will be boarded below Khora creek, and should anchor to await the arrival of the Harbour Master if necessary.

A vessel arriving at Basra, bound for Ma'qil wharves, and not having dangerous cargo on board will be boarded by the Harbour Master below Jubailah creek. A ball displayed at the port signal station will indicate that the Harbour Master is on his way to board the vessel; if a cone is displayed instead of a ball, the vessel should anchor to await his arrival.

Vessels bound for Abādān will be boarded by a Harbour Master outside the harbour limits. The same ball and cone signals will be displayed for this purpose from the signal station on board the control vessel, as at Basra (*Lat. 30° 30′ N., Long. 47° 50′ E.*).

All vessels of more than 200 tons gross measurement, when anchoring, are required to moor with two bower anchors and 60 fathoms ($109^{m}7$) of chain cable on each. The anchors are laid up and down the river.

Port facilities.—Stocks of coal are not normally maintained. Vessels requiring fuel oil usually bunker at Abādān, but, by arrangement, can be bunkered in the stream from lighters; there are several oil lighters available, varying from 50 to 500 tons capacity. Small craft can obtain fuel oil at Muftieh, about half a mile below Jubailah creek.

Fresh water is supplied from hydrants at the wharves or from water barges; two of these craft are available, of 500-ton and 40-ton capacity, respectively. Boiler water can be taken direct from the river.

In addition to the cranes at the wharves, there is a 60-ton floating sheer-legs, a 25-ton self-propelled floating crane, a 15-ton crane vessel, and a buoyage vessel with an 8-ton crane.

There are two ocean-going tugs of about 1,200 H.P., and two smaller one of 300 H.P.

The port engineering workshop is situated in the vicinity of Jubailah.

There are two floating docks at Abādān, and a patent slip at 'Ashār; for details of larger dock and patent slip, *see* Appendix I.

Communications.—There is regular steamer communication with Bombay and ports in the Persian gulf.

Basra is connected to the general telegraph and telephone systems.

There is regular communication by air with England and India, and thence to Australia.

Charts 1235, 1265, 2847, 2858, 748b.

Chart 3846.

Radio station.—Radiobeacon.—There is a radio station, *see* page 18, and a radiobeacon at Ma'qil (*Lat. 30° 33′ N., Long. 47° 48′ E.*).

Tidal streams.—The rate of the tidal streams at Basra varies with the seasons of the year. During the flood season, from February to June, the out-going stream, accelerated by the freshets due to the melting of the snow in the mountains, may attain a rate of 4 knots, while the in-going stream may be entirely overcome by the out-going current. During the dry season, from September to December, the rate of the out-going stream varies between 2 and 3 knots, and that of the in-going stream from one to 2 knots.

Observations show that the in-going tidal stream at Basra makes about 3½ hours before the time of high water there or about 2 hours after the time of high water at the bar of the Shatt al 'Arab, and that the ebb tidal stream begins about 1¾ hours after the time of high water at Basra or about 7¼ hours after the time of high water at the bar of the Shatt al 'Arab. These times are subject, however, to seasonal and other variations, that of the commencement of the in-going tidal stream preceding the lower high water being considerable, and amounting to as much as 1½ hours on either side of the average. Slack water would appear to be of short duration.

Tide-gauge.—There is a tide-gauge a short distance south-eastward of No. 8 wharf, Ma'qil, and an automatic tide-gauge farther north-westward.

Charts 3846, 1265.

Basra to Al Qurna.—Buoyage.—Light.—The Shatt al 'Arab is navigable by vessels with a draught of 15 feet ($4^{m}6$) as far as Al Qurna, situated about 40 miles above Basra, at the confluence of the Tigris and Euphrates.

A spit, with a depth of 11 feet ($3^{m}4$) at its outer end, extends about half a mile south-eastward from the south-eastern extremity of Coal island, which is situated in the middle of the river, about 4½ cables north-north-westward of the north-westernmost wharf at Ma'qil. A black conical buoy and a conical light-buoy, painted red and white in horizontal bands and exhibiting a *red quick flashing* light, are moored on this spit about 3 and 4 cables, respectively, from the south-eastern extremity of Coal island. North island (*Lat. 30° 35′ N., Long. 47° 46′ E.*) lies about 2½ cables north-westward of Coal island. The deeper channel lies north-eastward of these islands.

An airfield, where a light for aircraft is exhibited, is situated on the south-western side of the river about 1½ miles above Ma'qil.

A wooden bridge crosses the Shatt al 'Arab about 2 cables above the south-eastern extremity of Coal island; there is a navigable passage about 20 yards ($18^{m}3$) wide through it. It is flanked by four framework structures, each about 45 feet ($13^{m}7$) high. The end of the bridge, at the western side of the passage, is marked by two circular boards, about 4 feet ($1^{m}2$) in diameter, elevated about 10 feet ($3^{m}0$) above the bridge, the southern painted red and the northern white.

Chart 3847.

The water from Hammar lake flows out through Qarmat 'Ali (*see* page 276), into the Shatt al 'Arab abreast the gap between Coal and North islands; flowing from westward, it is comparatively deep for the last few miles. Telegraph wires are suspended across the mouth of Qarmat 'Ali with about 70 feet ($21^{m}3$) overhead clearance.

Charts 1235, 2847, 2858, 748b.

Chart 3847.

The western bank of the Shatt al 'Arab, both above and below Qarmat 'Ali, is bordered with brick kilns.

About 5 miles northward of the northern extremity of North island, the Katiabān (Kutaiban) canal enters the eastern side of Shatt al 'Arab, and is reported to connect with Kārūn river. The eastern bank of Shatt al 'Arab between Basra and the canal is bordered with date groves. Northward of the canal is an open sandy desert, and the western bank has a thin fringe of date palms, beyond which is desert that is sometimes flooded.

About 2 miles northward of the entrance to the canal, the river turns north-westward, with general depths of 4 fathoms ($7^{m}3$) near its north-eastern bank; near the south-western bank it is shoal for the first 2 miles, after which it is steep-to on that side, with greater depths close to a prominent point, above which vessels should keep to the south-western side of the river. Nahr 'Umr is situated in this reach on the south-western bank of the river, about 6 miles above the mouth of the Katiabān canal (*Lat. 30° 41′ N., Long. 47° 46′ E.*).

For the next 17 miles there is no difficulty in the navigation. Ash Shāfi creek, with five brick kilns at its entrance, is easily identified on the western bank, about 10 miles above Nahr 'Umr; the western bank, northward of this, is backed by an open plain.

About 1¼ miles northward of Ash Shāfi creek there are depths of less than 2 fathoms ($3^{m}7$), but farther northward they increase to 3½ fathoms ($6^{m}4$), and about 3 miles northward of the creek the river narrows, and the western bank, which is thickly bordered with date palms, is steep-to, with depths of 4 fathoms ($7^{m}3$) close alongside.

The river Shuwaiyib flows in on the eastern side, where the Shatt al 'Arab is narrowest, about 8 miles above Ash Shāfi creek; for the first 12 miles it has depths of 2 or 3 fathoms ($3^{m}7$ or $5^{m}5$) and is tortuous, but it is too narrow for any vessel larger than a steam launch.

Chart 3847, plan of Qūrna reach and bar.

At Odin point, on the western bank close northward of the entrance to the Shuwaiyib, the Shatt al 'Arab widens into Qurna reach and forms the bar of the combined Tigris and Euphrates. The greatest depths are close along the north-eastern bank, where the channel is very narrow, with a least depth of 7 feet ($2^{m}1$) in the fairway. After passing the bar the river narrows again and the depths increase to about 6 fathoms ($11^{m}0$) at the junction of the rivers. Between Basra and Al Qurna the bottom is everywhere mud.

Al Qurna is a small town situated on the point formed by the junction of the Tigris and Euphrates rivers. It is connected to the general telegraph system.

Chart 2483.

TIGRIS RIVER.—General remarks.—This great river originates in Turkish territory in two head streams which unite about 70 miles from the northern frontier of 'Iraq. The united stream flows south-south-eastward past Mōsul, Baijī, Sāmarrā, and Baghdād, whence it trends south-eastward, and past Kūt al Imāra and 'Amāra to its junction with the Euphrates at Al Qurna (*Lat. 31° 00′ N., Long. 47° 26′ E.*). The total length of the river from its source to its junction with the Euphrates is about 1,150 statute miles. *See* distance table on page 261.

Charts 1265, 2847, 2858, 748b.

Chart 2483.

The effect of the tide is felt for about 30 miles above Al Qurna, but the current always runs downstream. Masters of river steamers running to Baghdād, etc., prior to 1898, reported that it was practicable to take vessels of about 10 feet (3^{m}0) draught for a distance of about 60 miles above Al Qurna, and of 9 feet (2^{m}7) draught, 90 miles farther. In the high river season a draught of 4 feet 6 inches (1^{m}4) is usual, but in the low river season a draught of 3 feet 3 inches (1^{m}0) should not be exceeded. A vessel with a draught of 3 feet (0^{m}9) has reached the Great Bund, 28 miles below Mōsul, which is about 200 miles in a direct line north-north-westward of Baghdād.

Charts 3847, 2483.

The river is narrow, and difficult to navigate, on account of its numerous bends. The depths are from 2 to 4 fathoms (3^{m}7 to 7^{m}3) for the first 10 miles from Al Qurna, but the current is strong. The river is nowhere wide enough in which to turn round. In most cases, when vessels meet, one has to bank in to allow the other, to pass.

Chart 2483.

Rises in the river are caused by rain and melting snow. These rises usually begin about the middle of November; the first rises invariably fall again very rapidly, a fall of 5 feet (1^{m}5) during a night has often been experienced in the upper reaches, but by the end of December the river is usually full. After the second "rain-rise" the river continues good during the remainder of the winter months.

The rises due to snow start in early March, and by the end of that month or early in April the river is in full flood; about the middle of April, rises from this cause cease, but a rise may occur owing to late rains. In May, the river begins to fall, and great care must be taken in navigating it, as the channels are not then formed; when the scour of the river has formed the channels, navigation becomes easier.

In June, the depths are greater, but the channels must be carefully adhered to; in July, the channels are apt to be most erratic, and in August, they begin to form; in September, the river reaches its lowest level, and during this month steamers have made their worst passages; in October, at the first snap of cold or cooler weather, the sand banks appear to harden and the channels scour out several inches deeper.

Navigation in the Tigris varies with each season of the year, and as each year in itself varies, no hard and fast rules can be laid down. In a good or favourable year the "rain-rises" come regularly, and though the level may at times fall slightly, the river is always gaining, In bad years, the river perhaps falling later, a very high rise amounting to anything up to 12 feet (3^{m}7) at Baghdād, may come at any time in December or January; occasionally, however, the river falls almost to its lowest (summer) level.

A rise in the river is naturally felt later towards its lower reaches. A rise at Maslu takes some three days to reach Baghdād, and about the same time to travel to Al Qurna (*Lat. 31° 00′ N., Long. 47° 26′ E.*).

Floods occasionally occur. Usually the rise above normal river level is about 2 feet (0^{m}6), but 8 feet (2^{m}4) has been observed at Baghdād. A very heavy rainfall in January, 1896, caused the river to rise 8 feet (2^{m}4) in one night, with the result that the embankments were broken down, and a sea was formed round Baghdād, about 25 miles in length and about 6 miles wide. The water rose to a higher level than the city, which is, however, surrounded by a glacis. There

Chart 1265.

Chart 2483.

was also a great inundation in April, 1894, and another in March, 1923.

During low river, occasional groundings are almost impossible to avoid, and local pilots are employed. In general, the greatest depths are obtained on the outside of the bends, but this is not invariably the case.

As the level of the river falls, the channels often change, so that in certain sections local pilots should be engaged. Pilots can usually be obtained at Basra, ʻAmāra, ʻAlī Gharbī, Kūt al Imāra, Bghaila, Al ʻAzīzīya, and Baghdād.

The nature of the river bottom between Basra and Baghdād is mud, and no rocks are found between these places. Ships taking the ground can usually haul off by laying out anchors. The tendency of the current is quickly to wash away the mud on the up-stream side of a vessel, and to form a bank on the other, which sometimes rises above the water in three or four hours.

During April and May, sudden squalls, known as " guttras," are frequent, often necessitating the furling of awnings, etc.; these squalls are experienced most frequently in the neighbourhood of ʻAlī Sharqī and all small craft must make fast while they are blowing.

Al Qurna to ʻAmāra.—From Al Qurna to ʻAmāra the general depth is about 13 feet ($4^{\mathrm{m}}0$) at high river and 6 feet ($1^{\mathrm{m}}8$) at low.

Between Al ʻAzair or Ezra's tomb and Al Qurna, the river is marked by black posts on the right bank and white posts on the left, to denote the course of the river when the banks are covered during floods. The river between Al ʻAzair, Al Qurna and Sarifah is always good, but there are some bad bends, the worst being at Humaiyān, and the southern bend of Majrum reach.

The section Ghumaiqa Shargi to Abū Rūba is the worst part of The Narrows (*see* below). In the low river season this reach is extremely difficult, owing to the narrow and tortuous course of the channel combined with the very strong current. Great care must be taken to avoid grounding on the spits which extend a considerable distance at the worst bends. From Abū Rūba to Qalʻa Sālih, with the exception of Nufaikh reach, the river is good, though narrow.

The channels, mentioned below, deprive the Tigris of a large amount of water, which causes the river to narrow below Qalʻa Sālih to a width of about 60 or 70 yards ($54^{\mathrm{m}}9$ to $64^{\mathrm{m}}0$), forming that section of the river referred to above as The Narrows, that is to say, the Jahala canal on the left bank of the river at ʻAmāra; the Majar canal, about 2 miles above Abu Sidra, on the right bank; and the Michrīyah canal, now partly dammed, about one mile above Qalʻa Sālih, on the left bank. The worst reach in the Qalʻa Sālih to ʻAmāra section is the Mūzānīya reach, about 4 miles above Qalʻa Sālih; with the exception of this reach the river is generally good throughout the year. Since 1928, the Narrows have become more difficult to navigate owing to the action of the regulator at Majar canal, situated about half-way between Qalʻa Sālih and ʻAmāra (*Lat. 31° 48′ N., Long. 47° 15′ E.*). This regulator, when opened, admits water to the Majar canal and causes the level in the Narrows to drop from 10 to 18 inches (254^{mm} to 457^{mm}); it has also caused a considerable amount of silt to be deposited in this section of the river.

ʻAmāra to Baghdād.—Navigation presents no difficulty to vessels of suitable draught in that section of the river between ʻAmāra and

Chart 1265.

Chart 2483.

Kūt al Imāra. The width, generally, is about 1½ cables, with a depth of 26 feet ($7^{m}9$) at high river, and 6 feet ($1^{m}8$) at low.

Between 'Amāra and Saiyid 'Alī canal a good depth is found all the year round. From the canal to Alī Gharbī there is a good depth nearly all the year round, but soundings should be taken continuously in this section.

During the low river season there are three bad reaches in the section between 'Alī Gharbī and Shaikh Sa'ad, viz., Said 'Abbās, Mandalīva, and Abud Dūd. The channels in these reaches are very liable to change. As vessels approaching the sharp bend at the lower end of Mandalīya reach are unable to see one another, caution should be exercised.

Kūt Camp is about 36 miles above Shaikh Sa'ad and the river between them is navigable all the year round; with care no difficulties should be experienced.

At Kūt al Imāra, the Hai branch, the ancient Tigris, leaves the right bank of the river.

From Kūt al Imāra to Baghdād, is the most difficult part of the river, and there are many shoals. The width of the river, generally, is from 300 to 400 yards ($274^{m}3$ to $365^{m}8$), with a depth of 26 feet ($7^{m}9$) at high, and 6 feet ($1^{m}8$) at low river. It is essential to carry a pilot with local knowledge.

Baghdād.—This famous city, situated about 460 miles above Basra, stands on both sides of the Tigris. Two boat bridges cross the river at Baghdād. The population, in 1954, was estimated at 552,047. Supplies are plentiful.

Baghdād is connected by railway with Basra. There is regular steamer communication with Basra.

There is communication by air with England and India and thence to Australia.

Above Baghdād small steamers can reach Sāmarrā.

EUPHRATES RIVER.—This river rises in the mountains of Armenia and flows southward into Syria and thence to its junction with the Tigris, its total length being about 1,800 statute miles.

The difference between the Euphrates and the Tigris is very marked; whereas the latter has a current of from 3 to 4 knots the Euphrates has little, if any. The difference in appearance is also very marked at Al Qurna (*Lat. 31° 00′ N., Long. 47° 26′ E.*), the water of the Tigris being muddy and chocolate in colour, while that of the Euphrates is very dark but comparatively clear. The Tigris water is said, however, to be the more wholesome of the two. *See* distance table on page 261.

Chart 3847.

From Al Qurna the main channel of the Euphrates trends west-south-westward, with depths of 2 fathoms ($3^{m}7$) for a short distance, but it soon deepens to 3 or 4 fathoms ($5^{m}5$ or $7^{m}3$), and for the first 20 miles presents no difficulty to a vessel with a draught of 12 feet ($3^{m}7$). Beginning about 7 miles from Al Qurna, there is a great U-shaped bend, which, however, is not sharp; its concave side is always deep.

After ascending for about 20 miles, the depths gradually shoal to 2 fathoms ($3^{m}7$) about 2½ miles below the large village of Kabāish; thence they decrease to 9 feet ($2^{m}7$) before reaching the village, the

Chart 1265.

Chart 3847.

greatest depths being close to the northern bank. At the village itself, there are depths of from 12 to 18 feet ($3^{m}7$ to $5^{m}5$). Vessels with a draught of 4 feet ($1^{m}2$) can reach the entrance of Hammar lake, about 6 miles above Kabāish, but the depth in the lake is only 2 or 3 feet ($0^{m}6$ or $0^{m}9$). The bottom is everywhere very soft mud.

Hammar lake has another outlet in Qarmat 'Alī, *see* page 276.

Chart 1235.

KHŌR BAHMISHIR.—Khōr Bahmishir is approached through Khōr al Amaya (page 260) across the flats between Maraqqat Abādān and Maidan 'Ali, over which there are depths of from 3 to 5 feet ($0^{m}9$ to $1^{m}5$) for about 2 miles. The channel is not marked, and the mud banks on either side of the approach do not dry until the flats have been crossed.

Khōr Bahmishir is about 40 miles long from its mouth to its junction with the Kārūn River, and has depths of from 6 to 19 feet ($1^{m}8$ to $5^{m}8$). It can be ascended, apparently, for about 23 miles by vessels drawing up to 7 feet ($2^{m}1$). There are two large bends near the middle of its course, the first beginning about 9 miles above the mouth of the river. The banks of the river near its mouth are of soft mud, sloping down to the water's edge and are covered with coarse grass above high-water mark; a few miles above its mouth the banks are steeper and harder. About 22 miles from the mouth of the river, villages and date gardens begin to border the banks and continue thence almost uninterruptedly to the junction with the Kārūn river. The northern part of the river, for about 15 miles, is very shallow and the depths are irregular, some of the mud banks drying almost across the channel.

As there are no pilots for Khōr Bahmishir, a vessel desiring to enter should endeavour to obtain the services of a bāgala man, who is acquainted with it; if obliged to enter without local knowledge, it is advisable to start on a rising tide. Within the entrance the greatest depths are close to the bank on the concave side of each bend, and a vessel should cross over at the beginning of each change in the direction of the river.

Chart 1265.

KĀRŪN RIVER.—General remarks.—This, the largest of the rivers of Persia and the only one navigable by steam vessels, takes its rise in the mountains of the Bakhtiārī country, about 100 miles westward of Isfahān, and after flowing for a considerable distance south-eastward, south-westward and then north-westward, enters the plains of 'Arabistān about 15 or 20 miles northward of Shūshtar, nearly 120 miles north-north-eastward of Khorramshahr.

See distance table on page 261.

The Kārūn is navigable by river steamers of 2 feet ($0^{m}6$) draught at any time, and of 5 feet ($1^{m}5$) draught when the river is high. It is from 2 to 5 cables wide, and the channel is very narrow in places, especially at the bends, where, as usual, the greatest depths are, in most cases, on the concave side. Sand banks extend from most of the points, sometimes half-way across the river. Vessels of 12 feet ($3^{m}7$) draught can reach Samana bend, 14 miles above Khorramshahr (*Lat. 30° 26′ N., Long. 48° 11′ E.*), but off the point there, the channel is narrow and the bend very sharp.

Chart 2858.

Chart 1265.

The best months for navigating the river are from December to May or June, when it is in spate either from heavy rain or melting snow.

The river is reported to rise sometimes as much as 20 feet (6$^{\text{m}}$1) or more between January and March due to very heavy rains up country; but such rises subside so quickly that advantage cannot be taken of them for navigational purposes. The rate of the stream in a high river is from 4 to 6 knots, and in a low river about 2 knots. There is least water from August to the first rain, when, for 20 miles below Ahwāz, the navigation is difficult for a steamer of 2½ feet (0$^{\text{m}}$8) draught. The tide is felt as far as 'Alī-ibn-al-Husain's tomb, 30 miles above the entrance.

Khorramshahr to Ahwāz.—The Kārūn river enters the eastern end of the Hafar channel (page 271), the main volume of its water flowing through that channel into the Shatt al 'Arab, the remainder turning south-eastward into Khōr Bahmishīr. From Khorramshahr to Ahwāz, the course of the river is tortuous between low banks, through an almost desert country, but abounding with a great variety of wild fowl. The first vegetation is above Rūbīn-bin-Ya'qūb tomb, 16 miles north-north-eastward of Khorramshahr, whence the banks become fringed with light scrub, the country being extensive plains.

Fārsiāt village is on the south-eastern bank, about 65 miles above the entrance; about 2 miles below it, and extending about 30 feet (9$^{\text{m}}$1) from the opposite side of the river, is a rock, which dries.

As far as Kūt 'Abdullah, a village on the south-eastern side of the river, about 37 miles above Fārsiāt village, the bottom is mostly sand, or sand and mud, and, with the above exception, is free from rocks.

Off Kūt 'Abdullah are some rocks, probably the remains of old buildings, with a depth of about 3 feet (0$^{\text{m}}$9) over them. From this village for a distance of about 6 miles, the river is much encumbered with sand banks and subject to constantly changing channels. At times the reach has to be bandalled (a method of river training by means of reeds and mats), to ensure sufficient depth for the passage of barges loaded to a draught of 2¼ feet (0$^{\text{m}}$7). The limit of navigation from seaward lies one mile below Ahwāz, and between this limit and Ahwāz there is a great rise in the river bed and a series of heavy, almost impassable rapids, followed by a navigable stream above the rapids. Near the limit of navigation from seaward there is a small natural basin, where vessels unload.

Ahwāz.—Ahwāz (*Lat. 31° 29′ N., Long. 48° 43′ E.*) is a modern town with a population, in 1940, of about 30,000, and is the centre of the grain district; it is reported to be 200 feet (61$^{\text{m}}$0) above sea level. A range of hills, rising to a height of about 220 feet (67$^{\text{m}}$1) above the surrounding plain, marks the position of the town; three small peaks lie close together, the highest, with an elevation of 420 feet (128$^{\text{m}}$0), being about 2 miles south-eastward of the town.

Chart 2483.

Ahwāz to Shūshtar.—The river, above the rapids, is sinuous, from one to 3 cables wide, and flows between banks from 15 to 20 feet (4$^{\text{m}}$6 to 6$^{\text{m}}$1) high, which gradually become steeper near Band-e Q̣īr. The country on each side of the river consists of extensive plains.

In general, the navigation of the upper river is more difficult than that of the lower; but, with the possible exception of the 2-foot (0$^{\text{m}}$6)

Chart 2858.

Chart 2483.

reach above Band-e Qīr, there is no part which cannot be negotiated with safety during the hours of darkness provided searchlights are fitted, and use made of buoys and navigational aids.

Between Ahwāz and Graneh, situated 2 or 3 miles up river, navigation is simple after clearing the islets immediately above the former. At Graneh, a few patches of stone have to be negotiated, and caution is necessary, thence to Kūt Saiyid Amaieh, a distance of about 7 miles, progress becomes slower, but most of the shoals are visible and navigation is not difficult. From Kūt Saiyid Amaieh to Wais, a distance of about 15 miles, the banks and shoals become more numerous, and a few groundings may be expected. Wais is a large village situated at the southern end of a long reach. Thence to Band-e Qīr there is a straight reach in which it is reported that there are only two bad places, where the river bed is of stone, namely at Helowdella and Bait Senafie. At Band-e Qīr, the river divides into three branches, named Āb-e Gargar, Āb-e Shateit and Āb-e Dīz; the first two reuniting above Shūshtar and resuming the name of Kārūn.

At Band-e Qīr, vessels bound for Shūshtar (*Lat. 31° 48′ N., Long. 49° 00′ E.*) enter Āb-e Gargar, the eastern branch, as Āb-e Shateit, the middle branch, is barred about one mile above Band-e Qīr by a ridge of rocks, which renders it impassable to a steam vessel, and nearly so to native boats. A bridge spans the river at Band-e Qīr, but it can be opened to allow the passage of the river craft. At Band-e Qīr the stream is from a quarter to half a cable wide, with general depths of from 3 to 6 feet ($0^{m}9$ to $1^{m}8$); under the telegraph wires there, a rocky ridge leaves a very narrow channel, barely permitting the passage of the steamers.

Jabal Kyat, a triangular-shaped summit of the nearest range of hills is an excellent mark.

The banks of the river in this locality are from 30 to 40 feet ($9^{m}1$ to $12^{m}2$) high, and a few miles above Band-e Qīr, the remains of an old ruined city are discernible, embedded in the cliff. The reach between Band-e Qīr and Kūt Saiyid Hassan, about 6½ miles up stream, is the most difficult of all, because of the narrowness of the channel and the depth available. The stern-wheelers and barges are frequently aground, or else strike the banks every few minutes. Above Kūt Saiyid Hassan, conditions improve, but progress is slow as far as Dar-e-Khazīneh, a distance of about 15 miles. The steamers stop abreast of Shalailīyeh village, which lies about 2 miles from the river bank 8 miles below Shūshtar. A short distance farther up, navigation ceases.

Shūshtar is a town with about 10,000 inhabitants.

Āb-e Dīz.—In August, 1891, the s.s. *Shushan*, a stern wheeler, 80 feet ($24^{m}4$) long, 30 feet ($9^{m}1$) beam, and 2½ feet ($0^{m}8$) draught, ascended the Āb-e Dīz, which, starting from Band-e Qīr, follows a very tortuous course through flat uncultivated country and vast jungle as far as Kūt 'Abdush Shah. Entering by a channel 20 yards ($18^{m}3$) wide, the vessel proceeded for 1½ hours through a winding channel, with a depth of 3 feet ($0^{m}9$); it then deepened to an average of 9 feet ($2^{m}7$), except where barred by long sand banks about every 5 miles; in the crossings there were depths of 3 feet ($0^{m}9$).

On the third day, the *Shushan* arrived at Kūt Bandar. At this place a reef of rocks extends across the river, through which there is a straight channel with a depth of 4 feet ($1^{m}2$). Thence passing

Chart 2858.

Chart 2483.

through intricate channels, she arrived at Umm 'al Wawieh, about 10 miles beyond Kūt Bandar.

Not being able to proceed farther, the return journey was started on the following day, and much difficulty was experienced through grounding and striking in the bends. The ascent occupied 51 hours and the descent 36 hours.

During spring and winter, the Āb-e Dīz can be navigated as far as Kūt 'Abdush Shah, which is about 80 miles by river from Dizfūl, a town of about 15,000 inhabitants.

Communications.—There is regular steamer communication between Khorramshahr (*Lat. 30° 26′ N., Long. 48° 11′ E.*) and Ahwāz.

Dizfūl and Shūshtar are connected to the general telegraph system.

Chart 2858.

H.—83. (Revised—February, 1939).

APPENDIX No.

LIST OF PORTS AVAILABLE FOR UNDER-WATER REPAIRS,

With details of largest Dry or Floating Dock or Patent Slip at each Port.

NAME OF PORT AND TYPE OF DOCK, ETC.	Length from Bilge of Caisson or Mitre Post of Gates at		Maxi-mum Length of Keel Blocks (3)	Breadth of Entrance at		‡Distance {below (+) above (−)} Chart Datum level of			Springs rise (9)	FLOATING DOCKS, PATENT SLIPS, &c.			REMARKS (13)
	Coping Head (1)*	Floor Head (2)*		Coping (4)†	MHWS level (5)†	Sill (6)	Blocks, at			Maximum Depth over Blocks		Lifting Power (12)	
							Entrance (7)	Head (8)		Forward (10)	Aft (11)		
	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	tons	
ĀBĀDĀN: Floating Dock	396	—	—	60	—	—	—	—	—	—	—	4,000	
ʻASHAR (BASRA): Patent slip	400	180	—	21	—	—	—	—	—	—	—	750	
MANĀMA (BAHREIN IS.): Patent slip	300	—	—	32 (cradle)	—	—	—	—	—	—	—	40	Steel cradle
SITRA ISLAND:													
(7 miles S.E. of MANĀMA) Patent slip	—	—	—	—	—	—	—	—	—	—	—	335	For barges up to 120 ft. long and 35 ft. beam.

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* In the case of Floating Docks, Patent Slips, &c., Column (1) = Extreme Length. Column (2) Length on Blocks or Cradle.

† In the case of Floating Docks, Column (4) = Breadth at Top. Column (5) = Breadth at bottom of Dock.

‡ In order to find the depths on Sill, &c., the quantities in columns (6), (7) and (8), should be applied according to sign to the predicted or calculated height of tide as obtained from the Admiralty Tide Tables.

APPENDIX II

LIST OF PRINCIPAL PORTS, showing particulars of depths, &c.

Port.	Depth below Chart datum level.		Rise of Tide.		REMARKS.
	In approach.	At anchorage.	Spgs.	Nps.	
			Feet.	Feet.	
Muscat . . .	Deep	5 to 10 fms.	7·6	6·6	
Jāsk bay . .	3¾ fms.	3½ to 4½ fms.	8·6	7·5	
Bandar 'Abbās .	8 to 5 fms.	3½ to 4 fms.	10·5	9·2	
Hangām sound .	5¼ to 6 fms.	7 to 9 fms.	7·5	6·8	
Lingeh . . .	5 to 6 fms.	33 feet	7·2	6·1	
Bushire, outer . .	Deep	4¼ to 5 fms.	5·2	3·2	
,, inner . .	2½ fms.	3¼ to 3½ fms.	5·2	3·2	
Umm Said . .	33 feet	7 to 11 fms.	6·4	4·4	
Dōha . . .	13 feet	18 to 21 feet	5·4	4·0	
Bahrein:—					
Outer harbour .	20 feet	4 to 6 fms.	6·8	5·4	
Inner harbour .	15 feet	14 to 17 feet	6·8	5·4	
Dammam . .	28 to 36 feet	—	6·3	4·8	36 feet alongside wharf.
Ras at Tannūra . .	40 feet	—	6·3	4·8	34 feet alongside wharf.
Bandar Misha'ab .	24 feet	30 feet	Maximum Range about 9 feet.		
Mina al Ahmadi .	Deep	—	9·8	8·9	43 to 50 feet alongside wharf.
Kuwait harbour:—					
Off Kuwait, outer .	8 fms.	7 to 9 fms.	7·8	6·6	
,, inner	5 to 6 fms.	3¼ to 5½ fms.	7·8	6·6	
Bandar ash Shuwaik	1½ fms.	4 to 6 fms.	7·8	6·6	
Dōhat Kādhima .	4¼ to 5 fms.	5 to 6 fms.	7·8	6·4	
Khōr Mūsa . .	31 feet on bar in 1951	5 to 15 fms.	11·1	10·5	32 feet alongside wharf at Bandar Shāpūr in 1948.
Ābādān . . .	22½ feet in New channel in 1954.	No. anchorage.	6·6	5·3	57 to 63 feet alongside wharves.
Basra . . .	19 feet on Kārūn bar in 1953.	29 to 39 feet.	7·3	6·1	21 to 28 feet alongside wharves at Ma'qil.

APPENDIX III

TIDAL STREAMS.

TABLE I.—Little Quoin island lighthouse, bearing 225°, distant 9·4 miles. (*Lat. 26° 35′ 24″ N., Long. 56° 39′ 30″ E.*)

S–hours .	¾*b*	¾*a*	1¾*a*	2¾*a*	3¾*a*	4¾*a*	5¾*a*	6¾*a*	7¾*a*	8¾*a*	9¾*a*	10¾*a*	11¾*a*
Constituent .	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.
SD—N.S. .	+0·3	+0·2	0·0	−0·1	−0·2	−0·3	−0·3	−0·2	−0·1	+0·1	+0·2	+0·3	+0·3
D—N.S. .	−0·2	−0·1	−0·1	0·0	+0·1	+0·1	+0·2	+0·2	+0·3	+0·3	+0·2	+0·2	+0·2
SD—E.W. .	−0·2	−0·3	−0·3	−0·2	−0·1	+0·1	+0·2	+0·3	+0·3	+0·2	+0·1	0·0	−0·2
D—E.W. .	+0·5	+0·3	+0·1	−0·2	−0·4	−0·5	−0·7	−0·8	−0·9	−0·9	−0·8	−0·7	−0·5
Q-hours .	H.H.W.	1*a*	2*a*	3*a*	4*a*	5*a*	6*a*	7*a*	8*a*	9*a*	10*a*	11*a*	12*a*
S–hours .	11¾*a*	12*b*	11*b*	10*b*	9*b*	8*b*	7*b*	6*b*	5*b*	4*b*	3*b*	2*b*	1*b*
Constituent .	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.
SD—N.S. .	+0·3	+0·2	+0·1	−0·1	−0·2	−0·3	−0·3	−0·3	−0·1	0·0	+0·2	+0·3	+0·3
D—N.S. .	+0·2	+0·1	+0·1	0·0	−0·1	−0·1	−0·2	−0·2	−0·2	−0·3	−0·3	−0·2	−0·2
SD—E.W. .	−0·2	−0·3	−0·3	−0·3	−0·1	0·0	+0·2	+0·3	+0·3	+0·3	+0·2	0·0	−0·1
D—E.W. .	−0·5	−0·4	−0·2	−0·1	+0·3	+0·5	+0·6	+0·8	+0·9	+0·9	+0·8	+0·7	+0·6

S = Intervals from H.H.W. at Shatt al 'Arab bar.
SD — N.S. = Semi-diurnal constituent, + direction N., — direction S.
D — N.S. = Diurnal constituent, + direction N., — direction S.
SD — E.W. = Semi-diurnal constituent, + direction E., — direction W.
D — E.W. = Diurnal constituent, + direction E., — direction W.

TABLE II.—Mitre hill, Jazīreh Hangām, bearing 332°, distant 13·8 miles.
(*Lat. 26° 27′ 45″ N., Long. 56° 01′ 35″ E.*)

S–hours .	1½*a*	2½*a*	3½*a*	4½*a*	5½*a*	6½*a*	7½*a*	8½*a*	9½*a*	10½*a*	11½*a*	12¼*b*	11¼*b*
Constituent	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.
SD—N.S. .	−0·3	−0·5	−0·5	−0·4	−0·2	0·0	+0·2	+0·4	+0·5	+0·4	+0·3	0·0	−0·2
D—N.S. .	+0·1	−0·1	−0·2	−0·3	−0·4	−0·5	−0·6	−0·6	−0·6	−0·5	−0·4	−0·3	−0·1
SD—E.W. .	−0·2	−0·2	−0·2	−0·1	+0·1	+0·2	+0·2	+0·2	+0·2	+0·1	−0·1	−0·2	−0·2
D—E.W. .	−0·2	0·0	−0·2	−0·4	−0·5	−0·6	−0·7	−0·7	−0·7	−0·7	−0·6	−0·4	−0·2
T–hours .	H.H.W.	1*a*	2*a*	3*a*	4*a*	5*a*	6*a*	7*a*	8*a*	9*a*	10*a*	11*a*	12*a*
S–hours .	11¼*b*	10¼*b*	9¼*b*	8¼*b*	7¼*b*	6¼*b*	5¼*b*	4¼*b*	3¼*b*	2¼*b*	1¼*b*	¼*b*	¾*a*
Constituent .	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.
SD—N.S. .	−0·2	−0·4	−0·5	−0·5	−0·3	−0·1	+0·2	+0·4	+0·5	+0·5	+0·3	+0·1	−0·1
D—N.S. .	−0·1	0·0	+0·2	+0·3	+0·4	+0·5	+0·6	+0·6	+0·6	+0·5	+0·4	+0·3	+0·2
SD—E.W. .	−0·2	−0·2	−0·2	−0·1	0·0	+0·1	+0·2	+0·2	+0·2	+0·1	0·0	−0·1	−0·2
D—E.W. .	−0·2	−0·1	+0·1	+0·3	+0·5	+0·6	+0·7	+0·7	+0·7	+0·7	+0·6	+0·5	+0·3

S = Intervals from H.H.W. at Shatt al ʻArab bar.
SD — N.S. = Semi-diurnal constituent, + direction N., — direction S.
D — N.S. = Diurnal constituent, + direction N., — direction S.
SD — E.W. = Semi-diurnal constituent, + direction E., — direction W.
D — E.W. = Diurnal constituent, + direction E., — direction W.

TABLE III.—Hangām sound, Ras al Masheh beacon, beacon 271°, distant 4 cables.

(*Lat. 26° 41′ 32″ N., Long. 55° 53′ 58″ E.*)

S–hours .	½*a*	1½*a*	2½*a*	3½*a*	4½*a*	5½*a*	6½*a*	7½*a*	8½*a*	9½*a*	10½*a*	11½*a*	12¼*b*
Constituent .	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.
SD . .	— 0·7	— 0·6	— 0·3	0·0	+ 0·4	+ 0·6	+ 0·7	+ 0·6	+ 0·4	0·0	— 0·3	— 0·6	— 0·7
D. . .	— 1·0	— 1·1	— 1·0	— 1·0	— 0·8	— 0·6	— 0·4	— 0·2	+ 0·1	+ 0·3	+ 0·6	+ 0·8	+ 1·0
H–hours .	H.H.W.	1*a*	2*a*	3*a*	4*a*	5*a*	6*a*	7*a*	8*a*	9*a*	10*a*	11*a*	12*a*
S–hours .	12¼*b*	11¼*b*	10¼*b*	9¼*b*	8¼*b*	7¼*b*	6¼*b*	5¼*b*	4¼*b*	3¼*b*	2¼*b*	1¼*b*	¼*b*
Constituent .	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.
S.D. . .	— 0·7	— 0·6	— 0·4	— 0·1	+ 0·2	+ 0·5	+ 0·7	+ 0·7	+ 0·5	+ 0·2	— 0·2	— 0·5	— 0·7
D. . .	+ 1·0	+ 1·0	+ 1·1	+ 1·0	+ 0·9	+ 0·7	+ 0·5	+ 0·2	0·0	— 0·3	— 0·5	— 0·7	— 0·9

S = Intervals from H.H.W. at Shatt al 'Arab bar.
SD = Semi-diurnal constituent, + direction 132°, — direction 312°.
D = Diurnal constituent, = direction 132°, — direction 312°.

TABLE IV.—In channel northward of, or about 6 miles southward of Jazīreh Tunb.

(*Lat. 26° 19′ N., 55° 19′ E., or Lat. 26° 09′ N., Long. 55° 19′ E.*)

S–hours .	1½*a*	2½*a*	3½*a*	4½*a*	5½*a*	6½*a*	7½*a*	8½*a*	9½*a*	10½*a*	11½*a*	12¼*b*	11¼*b*
Constituent .	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.
SD . .	— 0·9	— 1·0	— 0·8	— 0·5	0·0	+ 0·5	+ 0·9	+ 1·0	+ 0·9	+ 0·5	0·0	— 0·4	— 0·7
D. .	— 0·8	— 1·2	— 1·4	— 1·5	— 1·6	— 1·4	— 1·1	— 0·7	— 0·4	— 0·2	0·0	+ 0·3	+ 0·6
Q–hours .	H.H.W.	1*a*	2*a*	3*a*	4*a*	5*a*	6*a*	7*a*	8*a*	9*a*	10*a*	11*a*	12*a*
S–hours .	11¼*b*	10¼*b*	9¼*b*	8¼*b*	7¼*b*	6¼*b*	5¼*b*	4¼*b*	3¼*b*	2¼*b*	1¼*b*	¼*b*	¾*a*
Constituent .	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.	kn.
SD. . .	— 0·7	— 1·0	— 0·9	— 0·6	— 0·3	+ 0·2	+ 0·7	+ 1·0	+ 1·0	+ 0·9	+ 0·4	— 0·1	— 0·5
D. . .	+ 0·6	+ 1·0	+ 1·3	+ 1·4	+ 1·5	+ 1·4	+ 1·2	+ 0·8	+ 0·6	+ 0·5	+ 0·2	— 0·1	— 0·4

S = Intervals from H.H.W. at Shatt al 'Arab bar.
SD = Semi-diurnal constituent, = direction easterly, — direction westerly.
D = Diurnal constituent, = direction easterly, — direction westerly.

TABLE V.—FACTORS

a. SEMI-DIURNAL

Astronomical conditions	Factor
2 days after ☾ and ☽	0·5
3 days or 1 day after ☾ and ☽	0·5
3 days before ● and ○ or at ☾ and ☽	0·6
2 days before ● and ○ or 1 day before ☾ and ☽	0·7
1 day before ● and ○ or 2 days before ☾ and ☽	0·8
At ● and ○ or 3 days before ☾ and ☽	0·9
1 day or 3 days after ● and ○	1·0
2 days after ● and ○	1·0

b. DIURNAL

Astronomical conditions	Factor
1 day after E.	0·0
2 days after E. or at E.	0·2
3 days after or 1 day before E.	0·4
3 days before N. and S. or 2 days before E.	0·6
2 days before N. and S. or 3 days before E.	0·8
1 day before or 3 days after N. and S.	0·9
At or 2 days after N. and S.	1·0
1 day after N. and S.	1·0

● = New moon. ☽ = First Quarter. ○ = Full moon. ☾ = Last Quarter.
E = Moon on equator. N = Greatest north declination.
S = Greatest south declination.

EXPLANATION.—Tables I to IV depend on the assumption that the stream is entirely due to the moon. As this assumption is not correct, and as the observations available are insufficient for complete analysis, no high degree of accuracy is to be expected in the streams predicted from the tables.

Tables I to IV give rates of the semi-diurnal constituent of the stream at springs, and of the diurnal constituent due to the moon's greatest declination. Table V gives factors, by which these rates are to be multiplied in order to obtain the rates at other astronomical conditions.

The streams in Table I are rotary. It has, therefore, been necessary to give tables for both the N. and E. components. At other positions the streams run mainly in two opposite directions only, as given under the tables.

INSTRUCTIONS.—The first line of each portion of each table gives the interval from higher high water at the local reference station, the second line the interval from the corresponding higher high water at Shatt al 'Arab bar. The line marked SD in the left column gives the rates of the semi-diurnal constituent of the stream, and that marked D the rates of the diurnal constituent, according to the time intervals from higher high water.

The rates given in the tables are to be multiplied by the factor from Table V, according to astronomical conditions.

The stream to be expected at any time is the sum of the rates of the semi-diurnal and diurnal constituents at that time. When using Table I, the N. and E. stream components must be computed separately, and their resultant found from the Traverse table.

Example: Required direction and rate of stream at position of Table I at 20h. on 10 December, 1930.

10 December is 1 day before ○, 2 days before S. Factors, 0·8 and 0·9.

H.H.W. at Shatt al 'Arab bar 01 05 (11th). (Admiralty Tide Tables, Part I).

Referred to Shatt al 'Arab bar, time is 5h. before H.H.W.

N. Component: (− 0·1 × 0·8) + (− 0·2 × 0·9) = − 0·26
E. Component: (+ 0·3 × 0·8) + (+ 0·9 × 0·9) = + 1·09
Stream: 109° 1·12 knot.

NOTE.—Difference in times of H.H.W. at the local reference station and at Shatt al 'Arab bar is not constant; variations in this difference result in small differences in the computed stream.

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